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CHILTON'S

November 19, 1984

IRON AGE METALS PRODUCER

IRON AGE BUILDS THE DREAM STEEL MILL

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NOVEMBER 19, 1984 VOL. 227, NO. 22

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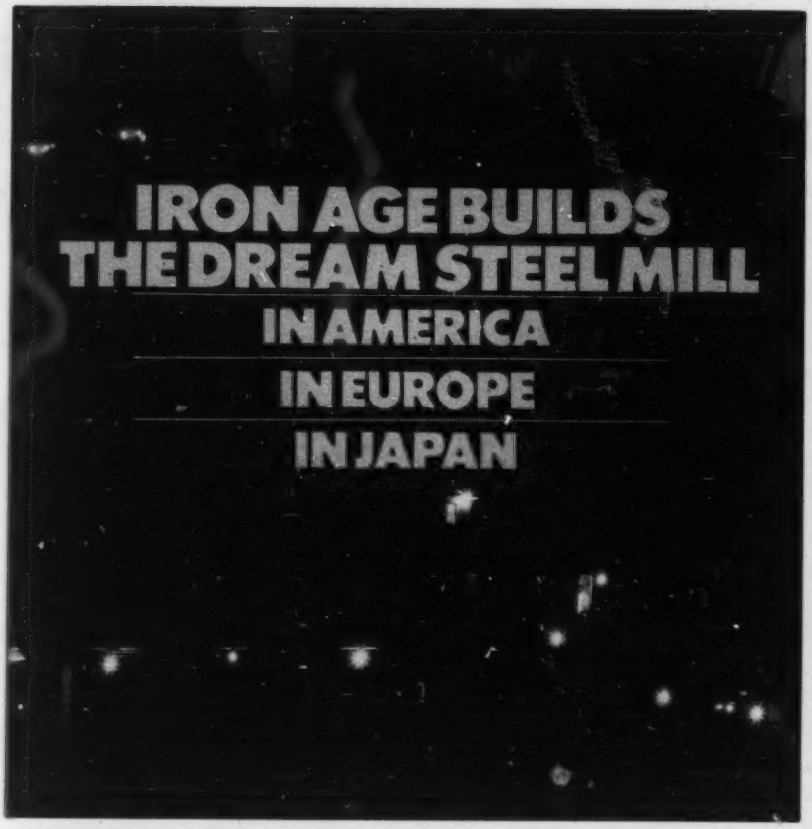

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IRON AGE (ISSN 0164-5137) is published 24 times a year by CHILTON COMPANY, Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, PA 19087 and additional mailing offices. IRON AGE is sent on a controlled free basis to qualified managers in U.S. metalworking companies. Non-metalworking companies, services, government, institutions, schools and colleges, $42 one year. Canada, $69 year. Foreign, $69 one year. Single copies, $2.50. Cable Chilton Philadelphia.
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Arco Aluminum Co., a unit of Atlantic Richfield Co. The package includes a 180,000 tons a year smelter at Sebree, Ky., as well as sizable rolling facilities. Alcan also will secure a 40 pct interest in Arco's new Logan County, Ky., can stock rolling mill.

Alcan was willing to buy the entire 400 million lbs a year Logan mill, but the U.S. Justice Department forced a separate agreement under which Alcan gets 40 pct and Arco keeps the remaining 60 pct for itself or for sale to a third party that cannot be any of the three major U.S. aluminum companies. Alcan can increase its equity via unilateral expansion of the Logan mill, the design of which provides for fast and sizable expansion of the cold rolling capacity.

Asked if, in view of its original intention to purchase all of Logan's current rolling capacity, Alcan was placing priority on expanding Logan as fast as it could, Alcan's top executives said the proper answer might be "we will be expanding it as quickly as we should."

Nickel producers expect demand to be in balance with supply during 1985

Is the tight clamp on nickel prices starting to relax a bit? Leading nickel producers think so, but they still aren't projecting anything like a fast recovery.

Demand should hold up in 1985, according to Inco, Ltd., and Falconbridge, Ltd., leaving a continued downtrend in inventories at the producer and London Metal Exchange (LME) levels to take the pressure off.

Free World Nickel Consumption

(In Millions of Lbs.)

	US	Japan	Europe	Other	Total
1st Qtr	88	84	121	27	320
2nd Qtr	85	85	118	27	315
3rd Qtr	70	80	94	26	270
4th Qtr	79	82	119	30	310

Source: Falconbridge Ltd.

Peter B. Salathiel, vice president, marketing for Inco Ltd., told a recent meeting of the National Association of Recycling Industries (NARI) in Pittsburgh that free world consumption of nickel should exceed supply (including imported material from U.S.S.R./Cuba) by 50 million lbs in 1984, pulling inventory down by that amount. Demand and supply should be in balance next year, he said.

He also noted that LME stocks have been declining markedly in recent weeks, "suggesting that producers are learning to adjust production to demand."

Mr. Salathiel said consumption could top new supply in the first half of 1985 by 20 million lbs and, with producer stocks nearing a bottom, the whole of the inventory adjustment will have to come from the LME stock. He also said the October declines in LME inventory suggest that a point may already be at hand. "My crystal ball does not tell me for how long demand will continue at its present level (but) as long as it does, we might see some interesting developments in the price of nickel over the near term," he said.

The LME spot price inched up toward $2.16 a lb by mid-October from $2.13 a lb a month earlier (during which period the pound sterling slipped to $1.1955 from $1.2655), but had been as low as $2.08 earlier in the second half.

Martin H. Webster, manager, market research for Falconbridge Ltd., told a NARI meeting in Toronto in mid-September that the LME cash price should not be overestimated as an indicator of the value at which the majority of free world producer nickel changes hands. He said the current LME price reflects mainly the price of cut Russian cathode and "even briquettes are trading at a 3¢ to 4¢ a lb premium."

When the LME price was at $2.14, the actual market price for nickel from producers ranged anywhere from $2.22 to $2.70 a lb, depending on grade and specific market area, he said.

Mr. Webster said free world nickel consumption was an estimated 635 million lbs in the first half of 1984, the highest since the record first half of 1979. Consumption was down in the first quarter to 270 million lbs, but the final period would see a return to the 310 million lb level, bringing the year's total to 1.215 billion lbs. Consumption in 1985 could reach 1.25 billion lbs and, should this projection prove low, "the industry's short term capacity to produce could be severely tested," he said.

Inco's Mr. Salathiel estimated demand levels at 1.25 billion lbs this year and 1.24 billion lbs in 1985. He also said total producer/LME stocks totaling 405 million lbs at the start of the year should be down to 355 million lbs as 1985 gets under way. Inco's own nickel inventory entered the fourth quarter at 85 million lbs, compared with 94 million lbs at midyear and 83 million lbs at the start of 1984.

Falconbridge's Mr. Webster said producers' stocks should finish the year at 295 million lbs, compared with 260 million lbs at the start of the year and noted that LME stocks have been in decline since last March. He also said the outlook for nickel prices must also reflect potential overcapacity and "the existence of government-sponsored producers who are prepared to sell at less than their cash costs of production."

Inco will reduce nickel production at its Walden plant

Inco Ltd.'s Canadian Alloys Division said it will cut the production rate at its Walden, Ont. rolling mill beginning Dec. 3, when operations will be cut to a single crew from the current two-shift cycle.

The Walden mill supplies the Royal Canadian Mint with pure nickel coinage products and produces nickel and copper-nickel strip for coinage requirements worldwide. Inco said worldwide coinage production has not recovered from the 1982 recession, making the cutback necessary.

The hourly paid workforce will be reduced by 23. Corresponding reductions in staff levels also will be made. Ten of the employees affected will be transferred to Inco's Ontario processing division. The remaining 13 lack the required seniority to move to the Ontario division.

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CHILTON'S

December 3, 1984

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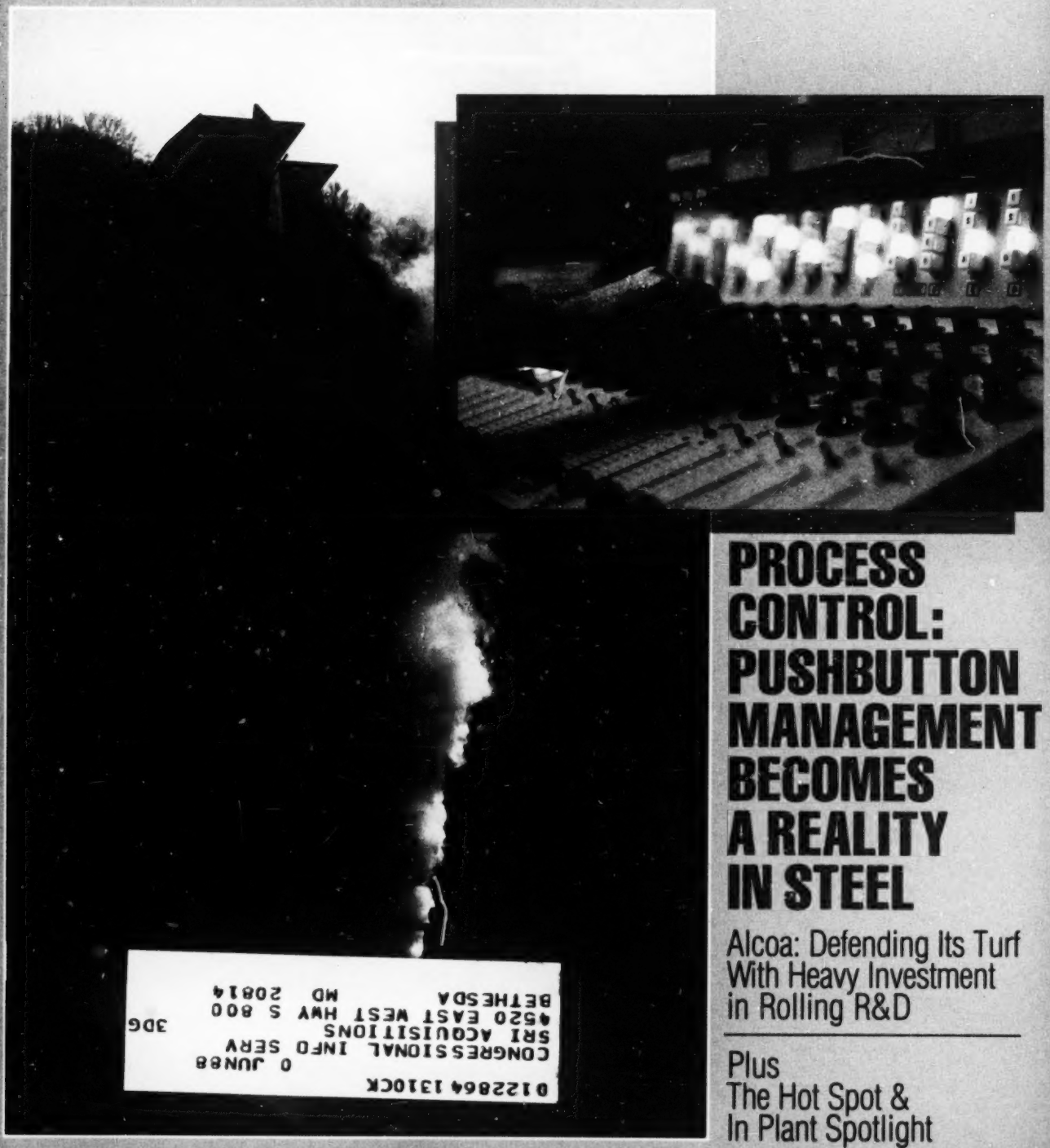

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PROCESS CONTROL: PUSHBUTTON MANAGEMENT BECOMES A REALITY IN STEEL

Alcoa: Defending Its Turf With Heavy Investment in Rolling R&D

Plus
The Hot Spot &
In Plant Spotlight

DECEMBER 3, 1984, VOL. 227, NO. 23

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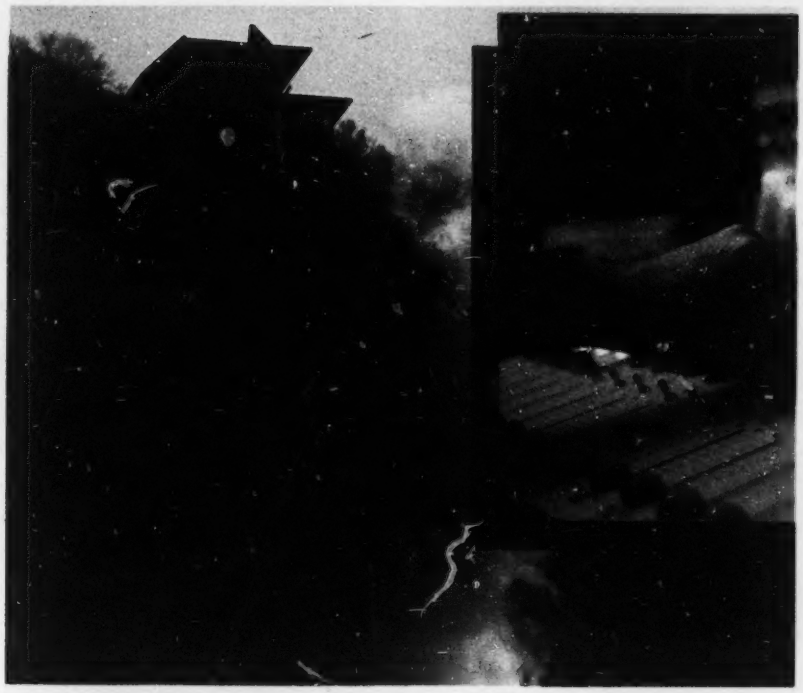

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IRON AGE (ISSN 0164-5137) is published 24 times a year by CHILTON COMPANY, Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, PA 19087 and additional mailing offices. IRON AGE is sent on a controlled free basis to qualified managers in U.S. metalworking companies. Non-metalworking companies, services, government institutions, schools and colleges. $42 one year. Canada, $42 year. Foreign, $49 one year. Single copies, $2.50. Cable Chilton Philadelphia. Send address changes to IRON AGE, P.O. Box 1440, Riverton, N.J. 08077.

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THE PUSHBUTTON AGE ARRIVES IN STEEL

What's new is the progress of steel companies in providing the hardware and software for fully computerized management.

BY GEORGE MCMANUS

When they look at process control, steel producers are starting to take in all the steps that go into selling, making and delivering material.

The whole sequence, with all support activities, is being integrated and optimized in computer networks.

"Our company-wide system is being developed for sales, optimum distribution methods, production planning and control, and cost and profitability verifications," said Shoichi Ide, managing director, Nippon Kokan (NKK).

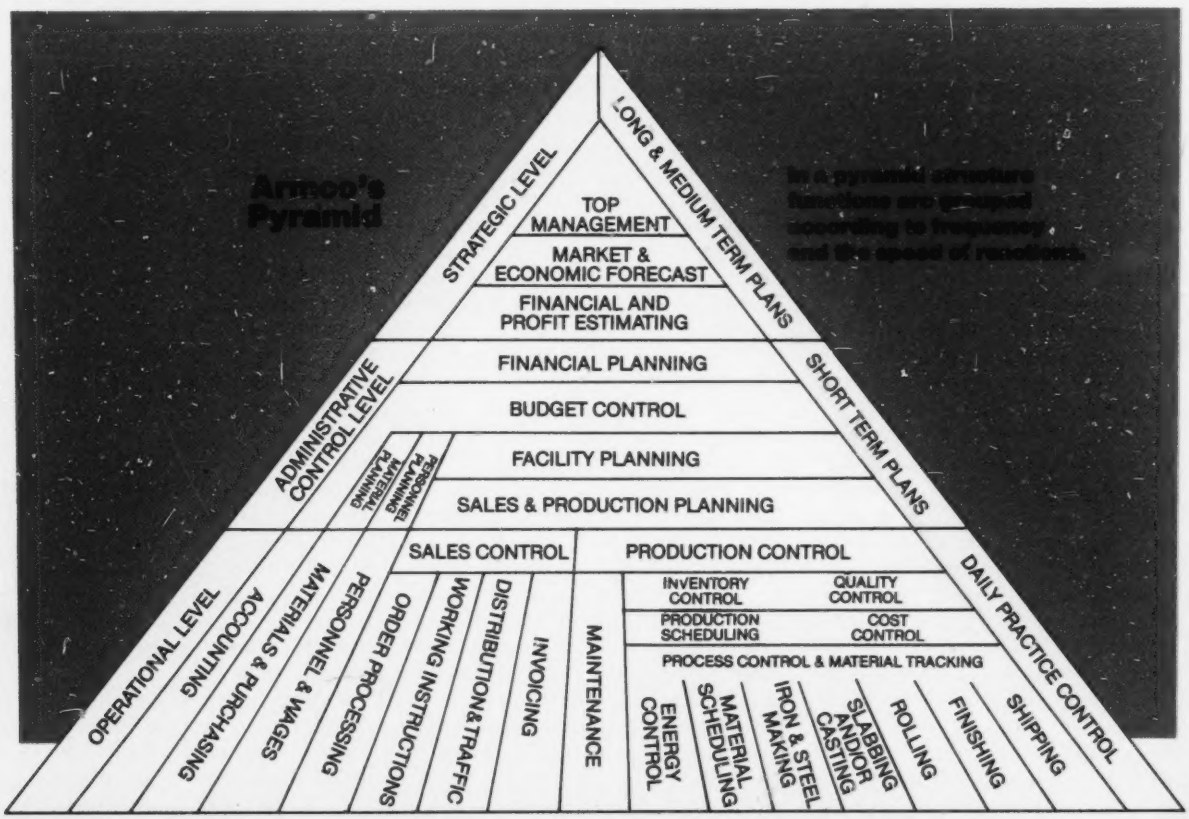
"Management systems are, or should be, coordinated, integrated systems," said Robert E. Boni, president of Armco Inc.

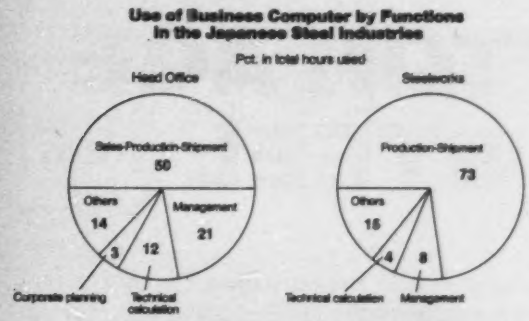
Information may be collected for a variety of purposes, Mr. Boni indicated, but the groups of facts should not be isolated.

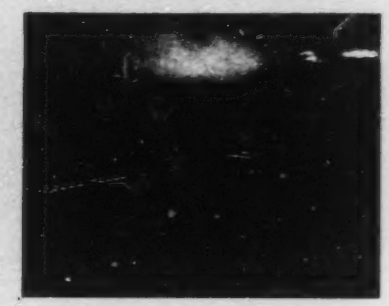
"These data should be reconcilable with one another," he said. "In a sense, a management control system is a single system, but it is more accurate to consider it a set of subsystems."

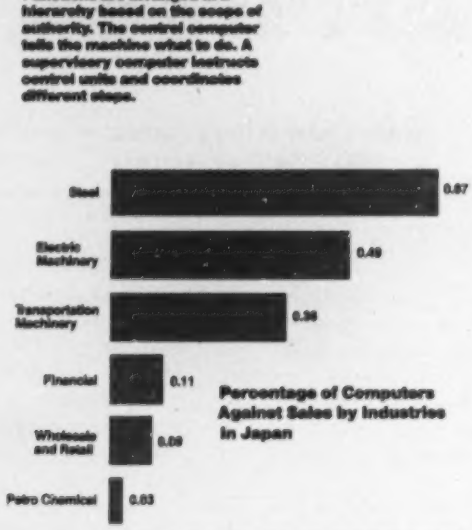
These comments were part of a panel discussion on information systems at the October meeting of the International Iron & Steel Institute (IISI). The word, information, is a little misleading; what was discussed was computerized management of entire companies.

This theme is not brand new. Twenty years ago, people were talking about total systems and pushbutton plants. Operations research people have long argued that the








In relation to sales, Japan's steel companies are spending twice as much on computers as the country's petrochemical companies.
In Japan and elsewhere, computer networks follow traditional organizational lines. Functions are arranged in a hierarchy based on the scope of authority. The control computer tells the machine what to do. A supervisory computer instructs control units and coordinates different steps.
Steel
0.67
Electric Machinery
0.49
Transportation Machinery
0.36
Financial
0.11
Wholesale and Retail
0.09
Petro Chemical
0.03
Percentage of Computers Against Sales by Industries in Japan

easiest job to program is the chief executive's.

What's new is the progress of steel companies in providing the hardware and the software for fully computerized management. It's of interest that basic steel with its stodgy image is leading the way in this area.

"Our steel industry puts computers to work much more than do other Japanese industries," said Mr. Ide of NKK.

In relation to sales, Japan's steel companies are spending twice as much on computers as the country's petrochemical companies.

In Japan and elsewhere, computer networks follow traditional organizational lines. Functions are arranged in a hierarchy based on the scope of authority. The control computer tells a machine what to do. A supervisory computer instructs control units and coordinates different steps. At the top of the pyramid is a computer which synchronizes the whole plant and interfaces with the corporate business system.

Pyramid

A somewhat different way of looking at the control structure is a pyramid based largely on timing. Functions are grouped according to frequency and the speed of reactions. Order entry is placed at the same level as machine control; both occur daily and call for fast decisions.

Above the operational level are administrative functions. Mr. Boni places various short-term managerial steps at this level. Financial planning, sales planning and budget control are in Mr. Boni's administrative bracket.

Evaluation and analysis are considered administrative functions by Sybren Kramer, assistant director in charge of automation of information systems, Hoogovens Groep BV.

At the top of the time-based pyramid is the strategy level. Long term and medium term decisions are made at this point, said Mr. Boni.

"This level," he said, "is the process of deciding on objectives of the organization, on changes in these objectives, on the resources used to attain these objectives, and on the policies that govern the acquisition, use and disposition of these resources."

In both the authoritative and time-based concepts, there is an ascending order of control and management. There are those who wonder if this hierarchy is appropriate.

"The computer will smash the pyramid," wrote John Naisbitt in the book, *Megatrends*. "We created the hierarchial, pyramidal management system because we need it to keep track of people and things people did. With the computer to keep track, we can restructure our institutions horizontally."

This passage was cited by William F. Monteith, corporate director, information resources management, Armco Inc. "I agree with Naisbitt that the organization will change," said Mr. Monteith.

There may well be changes, but at the moment, it is a monumental task to duplicate the existing organization with computers. The diagram of the computer network at NKK's Keihin Works gives some idea of the size and complexity of a steel plant control system.

Taking in the new Ohgishima complex, the system employs distributed process control with centralized information handling.

"The network consists of the cen-

The operational level is the lowest level of process control. Pictured is Leeds and Northrup's process control unit at U.S. Steel's continuous caster at its Lorain Works.

tral computer and local computers at individual mills and processes," said Mr. Ide of NKK. "An order entry arrives at the central computer from the Tokyo head office computer and is processed to include such additional elements as production, inspection, and shipment data. The Keihin control computer then sends appropriate instructions to the local mill computers..."

Status reports, operating conditions and inspection data are automatically logged throughout the process. Inspection certificates and invoices are automatically prepared.

The computer system has helped to reduce employment at Keihin Works from 18,000 in 1969 to 8,000 in 1984. Labor productivity has increased two to four times. Yield has been improved by as much as 5 pct.

This general format is being followed in steel plant systems throughout the world. At the Fairfield, Ala., pipe mill of United States Steel Corp., there is provision for four or five levels of control. The direct controls are at the lowest level. One step up are mini-computers that correspond to area foremen. Next, there is the divisional computer which takes in the whole pipe mill. On top of this is a computer which is wired into the entire plant.

There is then the link with the business computer. This takes in orders, sets production schedules, tracks orders and analyses quality.

At NKK's Keihin Works, the plant computer is connected to the headquarters computer system. The headquarters computer gives price and delivery information in response to inquiries. When orders are placed, the computer selects the appropriate plant—Keihin or Fukuyama—and forwards production instructions.

Adminstration

The head office computer also handles a variety of administrative tasks. Market projections, distribution studies, and different production analyses are part of the administrative function.

"All sales and administrative departments have access to the data base...." said Mr. Ide.

He saw a need to expand the role of the computer in the administrative field. "While production controls are well computerized at NKK, the primary targets from here on are more effective uses of computers in that important field of administrative control and strategy—the expansion to improve the field of management methods."

Mr. Kramer of Hoogovens agreed that the use of computers has lagged at the administrative level. "This is especially the case for evaluation and analysis where the information requirements seem to be constantly changing," he said.

"...decisions at the administrative control level are still based more on intuition and experience than on information derived from computer systems."

A wide variety of information must be available for administrative functions and human judgment figures importantly in evaluations. The difficulty is that linking qualified humans with the necessary data has been a cumbersome process.

This difficulty was reduced as more powerful computers and more flexible languages were developed in the Sixties. "The number of analyses grew gradually to a couple of hundred per year and over a hundred routine reports emerged," said Mr. Kramer of the Hoogovens program. "However, to solve a problem, the user still had to go through an intermediate programmer and selecting the required data from numerous tape files was very time consuming."

The result was a cost of $1,000 per analysis and two or three months time for a complicated study.

The time spans and the costs were reduced with further computer advances, but a satisfactory technology didn't arrive until what Mr. Kramer called the Fourth Generation computers.

"The fourth generation," he said, "is characterized by: very powerful query facilities which are easy to learn for users...; new data base management facilities which can handle the historical data and provide easy access to the data."

The new computers have what is called a 'relational data base'. This makes it possible for a manager to grope for information. The data is stored in such a way that there is no need to pre-define access paths," explained Mr. Kramer.

This characteristic can be employed by managers for trouble shooting, process control, quality control and investment evaluation. "They might ask what orders have been delivered to a specific customer and find out all the technical information on the material shipped...," said Mr. Kramer.

He looks for major advances in the administrative area. "Within a few years, end user computing might be a predominant growth factor in data processing," he said, "for in almost all functional areas, the requirement for new information sys-

U.S. Steel Using Cameras at Homestead

A camera positioning system has been installed at the Homestead Works of United States Steel Corp.

Supplied by Compunetics, Inc., of Pittsburgh, the system serves the 52-inch bloom and structural mill at Homestead. It replaces a mechanical vernier gauge in getting slabs properly positioned for cropping.

To get the right positioning, the operator watches a cathode ray tube. This displays the length of the slab as measured from the shear knife. Two cameras are required to provide the necessary accuracy and still cover the entire range of product lengths.

Field tests of the installed Compunetics unit were conducted to check the system's accuracy and reproducibility. These tests involved: 1. Cutting slabs to 15 to 23 foot lengths using the CRT display; 2. lifting the hot cut sections off the roller table, setting them aside, and allowing them to cool; 3. measuring the cold lengths of the cut sections; 4. using thermal expansion equations and measured temperatures to back-calculate to the hot length of the cut sections; 5. comparing the back-calculated hot lengths to those displayed by the camera system.

The comparisons of hot and cold lengths were complicated by the fact that all the cold sections were bowed and warped due to the hot lifting operation and nonuniform cool-down. Allowing for this distortion, Compunetics reported, the system functioned with precision and consistency.

The company has developed a variety of noncontact measurement systems. These use CCD line scan cameras and Compunetics processors for pattern analysis and recognition.

The Test Results of the Compunetics Slab Positioning System Installed at the Bloom and Structural Mill at U.S. Steel's Homestead Works

		Length (inches)			
Slab No.	Cut No.	Specified by Camera System	Measured Cold	Uncertainty in Cold Measurement	Back-Calculated Hot Length
1	1	180.0	177.1	+1.0/−0.0	179.6 – 180.7
	2	180.0	176.8		179.3 – 180.4
	3	180.0	176.8		179.3 – 180.4
2	1	276.0	270.8	+1.5/−0.0	274.6 – 276.2
	2	276.0	270.6		274.5 – 276.0

tems at the administrative control level exists."

Strategy

"The abundance of information available upon which to base strategic decisions is often overwhelming," said Mr. Monteith of Armco. "And yet as we all know, the more relevant information we have, the better our decision."

As in the administrative area, computer advances have facilitated the task of providing the right information for strategic management. Vast quantities of data can now be manipulated at a nominal cost.

"In just the past decade, processing technology has enabled a per unit performance improvement of approximately 1 million to 1," said Mr. Monteith.

He noted that today's computers not only provide ready access to internal data but make it possible to tap external sources for government statistics and private accumulations.

"Furthermore," said Mr. Monteith, "economic forecasting has been improved by the increasing availability of data."

After the disappointments of the last three years, steel producers may question any suggestion that market forecasting has become an exact science.

The difficulty of forecasting showed up in the failure of Armco's diversification strategy. After correctly assuming that the steel industry would return low profits, Armco diversified into financial services and energy. In both fields, the company suffered sharp reverses.

"Diversification doesn't help when everything goes bad at once," said Harry Holiday, chairman of Armco. With all the computers and information, no one has found a foolproof way of predicting when everything will go bad.

There are other areas where the values can't be quantified with any precision. Mr. Monteith cites some of the questions top management must answer.

"What does the customer want and how best can we serve him? Where do our obligations lie with respect to social conscience? What moral responsibilities do we have to the workforce and to welfare?"

The computer may not be able to give direct answers to these questions but it can provide indirect guidance. The computer can tell the chief executive how much it's costing to give the customer just-in-time delivery. It can measure the cost of discharging social obligations.

This information won't answer key questions but it will provide a basis for answers. The computer can't tell an executive how much the good will of a customer is worth, but it can give the inventory cost of maintaining good relations.

For the right kind of information to be available, Mr. Monteith indicated, top management must take part in defining strategic objectives. In accounting, inventory control, and other more traditional computer applications, the needs are obvious and the tasks repetitious. The strategy is more complex. □

ALCOA DEFENDS ITS HOME TURF

The company is spending heavily to beef up its flat rolled products division to maintain its position in rigid container sheet.

BY ROBERT REGAN

The bigger the turf, the larger the effort and expense needed to defend and enlarge it as market conditions permit. That's how it is with Aluminum Co. of America, which is spending heavily to beef up its flat-rolled products division, technologically and capacity-wise, to bolster its position in rigid container sheet (RCS) and other rolled products.

Alcoa executives stress that the program, which carries a price tag of about $1 billion if recent modernization moves are counted, is quality-driven. But they won't deny that there will be a quantity dividend, perhaps up to 20 pct. Alcoa chairman Charles M. Parry has called it "the most extensive and expensive flat rolled products modernization program in our 100-year history."

Centerpieces are the Alcoa, Tenn. mill, which makes mainly RCS and common alloy sheet, and Warrick, Ind., which is dedicated to RCS. Sizable modernization work already has been done at the Davenport, Iowa mill, which covers all flat-rolled products, and Lebanon, Pa. where lighter gage items are rolled, but further improvements are in the works at both.

Some observers see the program as a gamble in view of pressures from RCS expansions by competitors, imports and other materials. Alcoa calls it a must because customers are in a position to demand the highest quality, which is their ticket to higher profitability because it permits higher production speeds and reduces losses from downtime. Ability to deliver consistent quality will be even more important as the gage of RCS continues to narrow.

One of the biggest concerns to Alcoa and other domestic RCS was the ability of Japanese rivals to deliver consistently high quality RCS here at competitive prices. Low ingot prices helped, as did traditional Japanese talents with scrap supplies, but this wasn't the whole story. Alcoa credits as well the technique of Statistical Process Control (SPC) which the Japanese were quick to adopt and which Alcoa now uses at 12 plants and intends to make system-wide were also helpful. "With SPC," said Sandy Nelson division general manager, manufacturing, "we will track the history of each piece of metal, monitoring the gage, surface quality, temper, etc., continuously. If something is about to go wrong, we want to know what and why before it happens. Our responsibility no longer ends at the loading dock; it runs inside the customer's plant. In the case of RCS, it ends only after the customer makes a can of it, fills it with beverage and puts a lid on it."

What's at stake for Alcoa? Its sales of flat rolled products in 1983 brought in $2.3 billion, 43.6 pct of total revenues. Packaging and container market sales were $1.5 bil-

Aluminum industry shipments of flat-rolled products vs other aluminum products

Millions of lbs

	Sheet	Plate	Foil	Others*
1983	6,587	214	865	6,893
1982	5,471	216	751	6,078
1981	5,900	283	864	6,767
1980	6,660	317	840	7,594
1979	6,302	311	906	7,949
1978	6,500	[illegible]	[illegible]	[illegible]
1977	5,929	236	816	6,005
1976	5,502	217	784	5,622
1975	3,902	256	817	5,154
1974	5,357	324	762	7,287

*Includes forgings, extruded shapes, pipe and tube, drawn and welded tube, rod and bar, fasteners, etc.

lion, 28.4 pct of total revenues and 65.1 pct of flat-rolled product sales.

Industry shipments of RCS hit 3.34 billion lbs last year, 21.6 pct of total shipments and 47.7 pct of sheet shipments. In 1974, RCS accounted for 1.54 billion lbs, 11.2 pct of total shipments and 28.7 pct of sheet shipments. The period saw aluminum claim virtually all the beer can market and 87 pct of soft drink cans. With little room left for growth vs the steel can, the aluminum companies are combatting glass beverage containers and hoping for real penetration in the food can business.

RCS Capacity

Meanwhile, there are some problems, including the possibility that RCS capacity may be expanding too fast, in the near term at least. Cases in point are the new and expandable Logan County, Ky. mill to be managed jointly by Alcan Aluminum Corp., and Arco; a new can stock plant planned by Alumax, Inc.; recent modernizations by Reynolds Metals Co. and Kaiser Aluminum & Chemical Corp.—and the capacity dividend from Alcoa's program.

The Japanese can't be expected to just go away when ingot is an attractively-priced plentiful commodity, although the U.S. companies are hoping the Japanese will pursue traditional markets on their own side of the Pacific Rim.

Nor do the aluminum companies lightly dismiss the potential rivalry of the plastic soda cans, which Coca-Cola plans to test market in the U.S. and Canada in 1985 using containers made by Petainer Development Co., a joint venture of Metal Box P.L.C. of the U.K., Sweden's Aktiebolag and Dorsey Corp. of Chattanooga, Tenn. Another firm, Thermoforming U.S.A. of Columbus, Ohio, said it has a nearly-perfected entry under study by the soft drink companies.

Ron Hoffman, Alcoa group vice president, admits the plastic container is a threat, though probably over the longer term because "they have to do more work on recycling—or disposal—before they can blow us away." Thomas J. Tayler, division general sales manager, said it was "worrisome, very worrisome—which is to say we don't take it lightly. They aren't there yet, technologically, but I have to believe with all those chemical companies with money to spend, and with a fine marketer like Coke, they are going to surmount some of the obstacles. Still, there is the recycling matter and even the Petainer people will tell you that the Achilles heel of the thing is disposal. You can't compare the value of an empty aluminum can and an empty plastic can. What we've got to do is get our recycling rate up from 55 pct to 75 pct and that's what we are doing."

Mr. Hoffman said recycling "is a big advantage, a tight hook." As for the debut of the Logan mill, he said "anytime you bring on new capacity, there's some cramping (but) a lot depends on how they eventually size it and how quick they can become commercial." Asked if Alcoa was daunted by the plastic can, rising RCS capacity and imports, he said "what we are saying is that the risk is manageable enough to justify spending the money." The key, he said, is to be able to deliver consistent quality in narrower and narrower gages to maintain marketshare and advance as some of the opposition falls behind.

Wider Sheet Trend

The trend in RCS goes toward wider sheet, from which more blanks are punched, lightweighting, bigger coils, higher surface and metallurgical quality and flexibility in coatings. The gage in body stock is down to 0.013 in. from 0.016-in. 10 years ago and Alcoa is aiming for 0.010 in. by 1990. Can companies once content with coils wide enough to punch out five blanks now want coils for 12-outs and 14-outs. Much of the new gear at Alcoa, Tenn. and Warrick is designed to meet these requirements.

Planned for Alcoa, Tenn. is a "continuous-continuous" multistand cold mill that needn't stop to load coil. Looping the feedstock high at the business end provides enough time to join coil ends before the rollers draw the loop down. The mill will be able to handle 96-in. OD wide coil for RCS and will have expanded gage, surface, flatness and metal property controls. It is due onstream in 1987, one year after modernization of a hotline which includes more hp, widening to handle 80 in. sheet and addition of hydraulic gap control with roll eccentricity compensation for monitoring backup rolls for imperfections which could hamper operation. There also will be a new single stand cold mill for 80 in. coils, homogenizing furnaces and annealing furnaces.

Warrick, which turns out 500,000 metric tons of RCS a year, will be converted to EMC in 1986-89. Its hotline will be widened to handle sheet widths to 65 in. and quality improved. The No. 2 five-stand cold mill will be handling 64-in. widths by 1986 and the No. 4 six-stand (world's largest) cold mill also will be widened to 64-in. sheet. Warrick also is getting finishing capabilities for coating, levelling and slitting, including more width capability and an electro-coating process for more uniform coatings.

Davenport is slated for a $120 million modernization close on the heels of $120 million improvement which includes an 84-in. continuous finishing line, the cold mill, no-controlled saw/router combo, a microcomputer-controlled stretcher and a scalper able to work both surfaces simultaneously. The hotline is to be upgraded for higher quality and the No. 2 and No. 4 cold mills will be upgraded and widened, while the ingot unit will be capable of producing larger ingots of 96-in. coil capability.

Alcoa's program is designed to provide two or more mills able to make any product, protecting against shutdown problems. "Secondly," said Mr. Hoffman, "we'll have greater capacity and this will help us meet current and future customer needs in all phases of our business. Thirdly, and most importantly, we will have the equipment we need, combined with SPC-oriented people, to produce consistent quality throughout the system." □

NOTE

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PUBLICATION HAVE BEEN FILMED

Cov. 1, p. 3, 37-40, 45-48.

CHILTON'S December 17, 1984

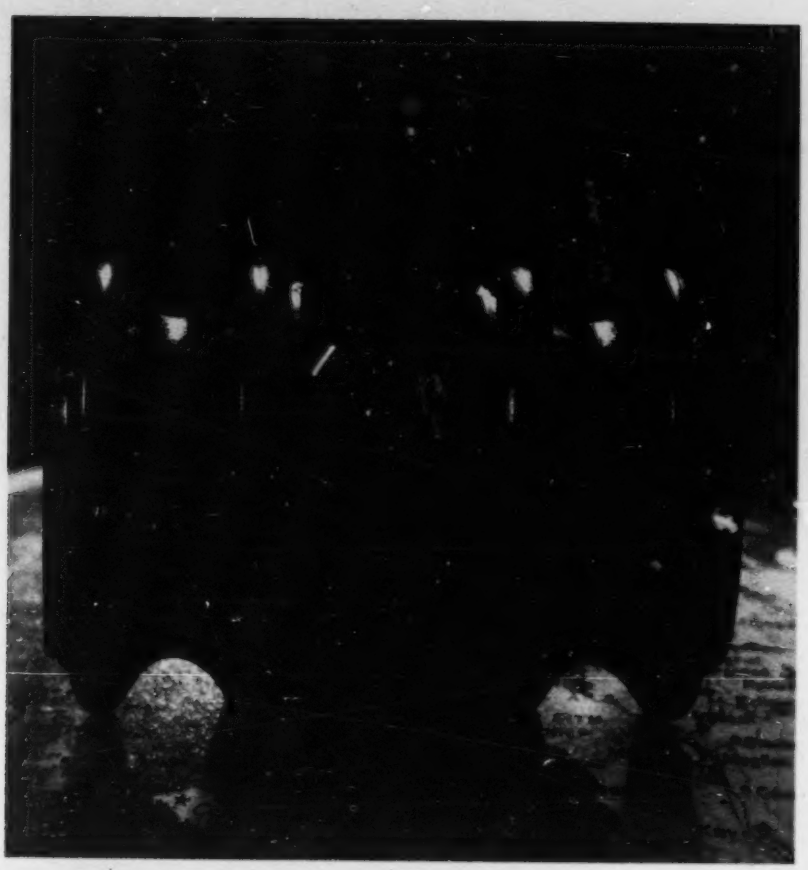
C21502

METALS PRODUCER

ECG
CONGRESSIONAL INFO SERV
SRI ACQUISITIONS
4520 EAST WEST HWY S BCO
BETHESDA MD 20814
0 JUN88
C12286413100K

DECEMBER 17, 1984 VOL. 227, NO.24

IRON AGE METALS PRODUCER



Beginning in January 1985, IRON AGE Metals Producer will be published on a monthly basis on the first Friday of each month.

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IRON AGE (ISSN 0164-5137) is published 24 times a year by CHILTON COMPANY, Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, PA 19087 and additional mailing offices. IRON AGE is sent on a controlled free basis to qualified managers in U.S. metalworking companies. Non-metalworking companies, services, government institutions, schools and colleges. $42 one year. Canada, $42 year. Foreign, $49 one year. Single copies, $2.50. Cable Chilton Philadelphia. Send address changes to IRON AGE, P.O. Box 1440, Riverton, N.J. 08077.

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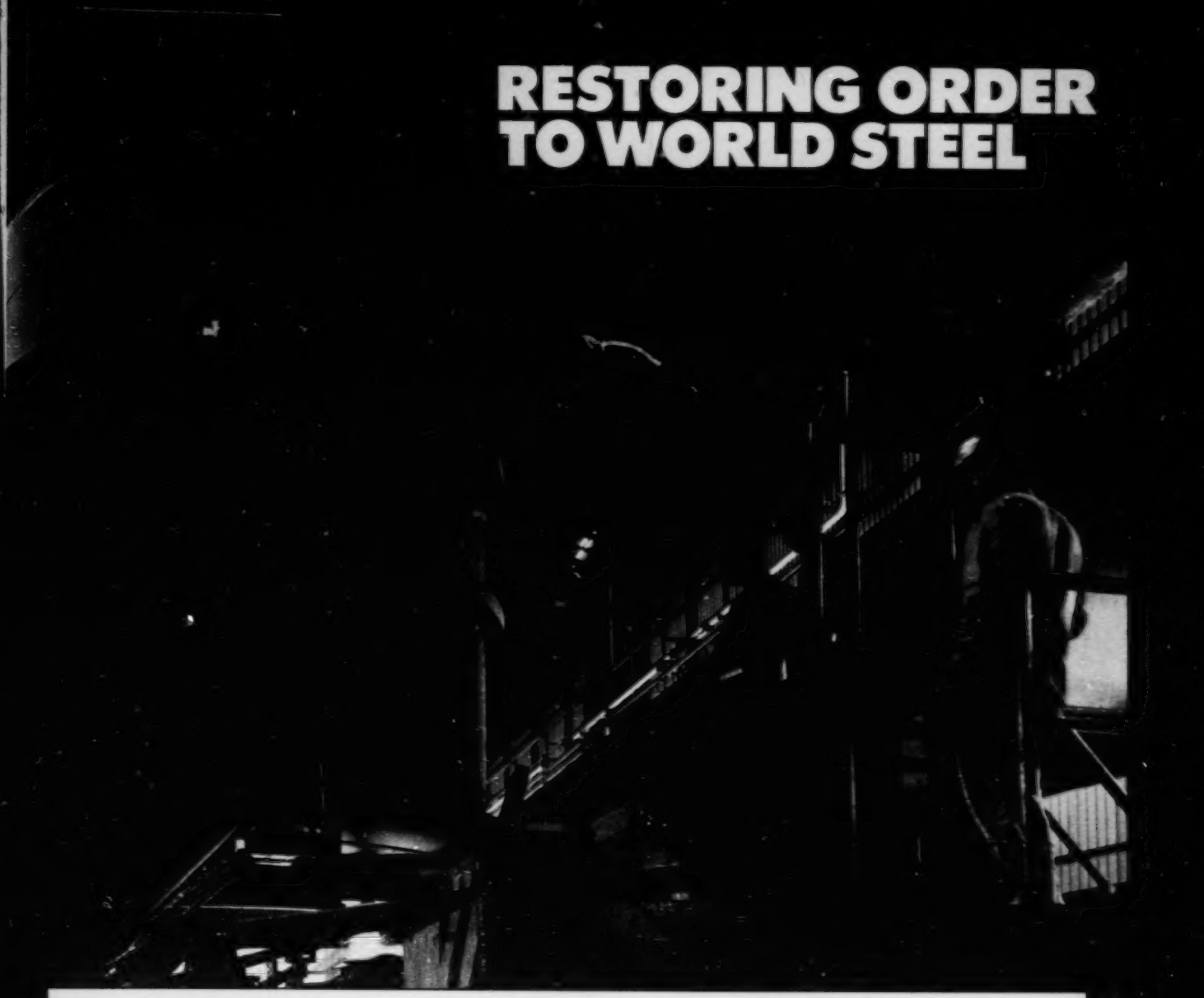
RESTORING ORDER TO WORLD STEEL



A REPORT FROM THE INTERNATIONAL IRON AND STEEL INSTITUTE MEETING

BY GEORGE MCMANUS

The Western World capacity of about 600 million tons is about 150 million tons greater than demand. IISI looks for this imbalance to continue through the rest of the decade; the world operating rate will be no more than 85 pct by 1990.

"We're not going to paper the world with steel trade agreements," said Commerce Secretary Malcolm Baldridge in early 1984.

The United States is now trying to negotiate a lot of steel trade agreements. Domestic producers only hope the government isn't papering over their problems with a lot of paper agreements.

The U.S. effort is a part of a general drive to restore order and profitability to the steel world. The Com-

STEEL CONSUMPTION/ PRODUCTION PATTERNS

IISI MEMBERS' COUNTRIES (29)
STEEL PRODUCTION, first 8 months
Millions of Metric Tons

	1984	1983	Pct Change 1984/83
EEC	79	70	+12.9
USA	60	49	+22.4
Japan	70	63	+11.1
Others	82	74	+10.8
Total	291	256	+13.7

mon Market is dealing with internal problems through a program that aims at eliminating excess capacity and government subsidies by the end of 1985.

The United States addressed part of its external problem in 1982 by securing a pact that limits steel imports from Europe. Recently announced by President Reagan was a program that seeks voluntary restraints on steel from Japan and the developing nations.

The affected countries have registered dismay, but the U.S. initiative really shouldn't be an occasion for surprise or outrage.

"We feel what Reagan is proposing is a normal procedure," said Pol Boel, administrator, Usines Gustave Boel SA of Belgium. "It affects us very little but I would say it is reasonable," said Mr. Boel, who heads the European Independent Steelworks Assn. (EISA).

The Reagan plan is considered reasonable and normal because it merely closes the one open loop in a world-wide network. "I think the bilateral agreements which European countries have with other steel producing parts of the world are probably more effective and comprehensive than what the American steel companies have at the present time," said Charles E. Schueppert, chairman of Sheerness Steel Co. Plc. of Great Britain.

Steel shipments into the Common Market are restricted by some 15 bilateral agreements. Taking in Japan as well as the developing nations, the agreements have been public knowledge for some time but seldom come up in discussions of U.S. trade policy.

To free trade purists, none of this is very nice. The world's steel producers are seen working out cozy deals that stifle competition and bilk the customer.

The fact is that the various pacts have been brought on by an excess of competition. And steel producers have never succeeded in bilking anyone. In the U.S., consumers have been able to buy domestic steel at $6 billion under cost for the last three years. That's how much the steel industry has lost since the start of 1982.

Outside the U.S., European steel companies sold their product for $3 billion under cost from 1981 through 1983. To free traders, this is great. 'Why should we deprive our manufacturers of the bargain prices on imports?', they ask.

Because you can't get something for nothing, said Donald H. Trautlein, chairman of Bethlehem Steel Corp. and of the American Iron & Steel Institute.

"Over the long term," said Mr. Trautlein, "the market has to pay a price for a product or you don't have a product. The market's not doing that now for all the steel that's coming into this country."

The fallacy in this statement has been that government subsidies can enable a company to give its product away for an indefinite period. That has been happening, but a day of reckoning may be approaching in the Common Market.

"The subsidies are being turned off," said Mr. Boel. "They have to end at the end of 1985. This has been coupled with a very strong restructuring."

He indicated the subsidy deadline was backed by heavy popular pressure. "It's certainly something that's going to stop because the taxpayer in Europe is getting sick of paying for the steel industry," he said.

British Steel Corp. has made genuine progress in restructuring and in putting operations on a solvent basis. In the past 10 years or so, the capacity of British Steel has been reduced from 27 million tons to under 15 million tons. Employment has been cut from 220,000 to 68,000.

The contraction has gone a long way towards making the company financially self-sufficient. "We would be in the black except for the coal strike," said Robert Haslam, chairman of British Steel.

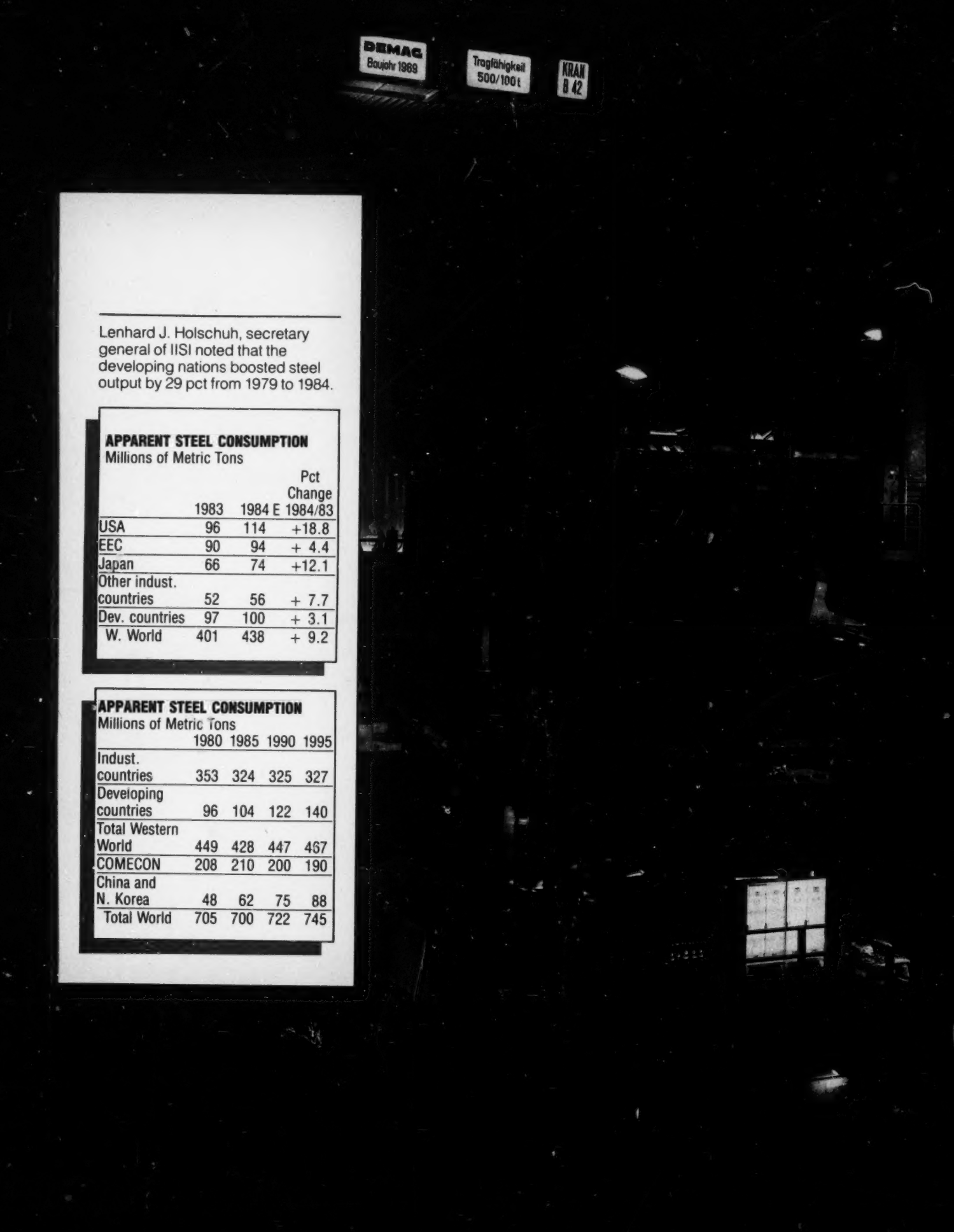
Speaking in October, Mr. Haslam pointed out that part of the subsidy money has really been going to the elimination of subsidies. More spe-

APPARENT STEEL CONSUMPTION
per cent per year change

	1980/85	1985/1995
Indust. countries	−1.7	+0.1
Dev. countries	+1.6	+3.0
Total W. World	−0.8	+0.9
COMECON	+0.2	−1.0
China and N. Korea	+5.3	+3.0
Total World	−0.1	+0.6

APPARENT STEEL CONSUMPTION
Millions of Metric Tons

	1984 E	1985	Pct Change 1985/84
EEC	94	94	—
Other W. Europe	31	32	+3.2
USA	114	112	−1.8
Japan	74	74	—
Other ind. countries	25	25	—
Total	338	337	−0.3



Lenhard J. Holschuh, secretary general of IISI noted that the developing nations boosted steel output by 29 pct from 1979 to 1984.

APPARENT STEEL CONSUMPTION
Millions of Metric Tons

	1983	1984 E	Pct Change 1984/83
USA	96	114	+18.8
EEC	90	94	+ 4.4
Japan	66	74	+12.1
Other indust. countries	52	56	+ 7.7
Dev. countries	97	100	+ 3.1
W. World	401	438	+ 9.2

APPARENT STEEL CONSUMPTION
Millions of Metric Tons

	1980	1985	1990	1995
Indust. countries	353	324	325	327
Developing countries	96	104	122	140
Total Western World	449	428	447	467
COMECON	208	210	200	190
China and N. Korea	48	62	75	88
Total World	705	700	722	745

cifically, the money has been going to displaced workers; the cost of eliminating jobs in Great Britain is $12,900 a man. Of the $300 million subsidy for British Steel this year, said Mr. Haslam, about half is for job cuts.

He said British Steel has been spinning off component operations and setting them up as private companies. Finally, Mr. Haslam noted one of the reasons the American market is so attractive to outsiders, is with only one currency, he said, the U.S. doesn't have the constant price changes that result from fluctuating exchange rates in Europe.

"It's much easier to make money in the United States," said Mr. Haslam, who once worked in America in the chemical business.

It hasn't been easy for American steel companies to make money, and U.S. producers aren't counting on foreign restructuring to solve their problems. The drastic surgery of Britain is acknowledged, but France and Italy are seen dragging their feet. U.S. producers doubt that steel companies on the continent will meet the 1985 deadline for trimming excess capacity and ending subsidies.

"When you say a year and a half, I don't think they have a Chinaman's chance," said David M. Roderick, chairman of United States Steel Corp. "It's very difficult to get out of a subsidized mode. It just breeds inefficiency."

"They certainly aren't going to have the restructuring completed by the end of '85," said Mr. Trautlein of Bethlehem. "Subsidies are now taking place in Germany, the one country that didn't have many. They're pumping millions into their industry."

The question of timing is important because the agreement which now limits European shipments to the U.S. is scheduled to end in 1985. The idea was that the subsidies would end then, too.

"It seems to me that the agreement would be subject to extention," said Mr. Trautlein. "If it weren't, we'd just refile the trade

WESTERN WORLD LIQUID STEELMAKING CAPACITY
Millions of Metric Tons

	1974	1980	1990
W. Europe	203	223	181/191
N. America	156	152	136/142
Japan	126	142	130/135
Dev. countries	33	60	104/116
Others	15	18	20/26
Total	533	595	571/610

CONTINUOUS CASTING
(Pct of Total Crude Steel)

	1973	1983
Japan	20.7	86.2
USA	6.8	32.1
EEC	9.4	60.4

YIELD: Finished products as percentage of crude steel production

	1973	1983	Difference
Japan	83.7	91.6	+7.9
USA	73.9	79.1	+5.2
EEC	74.3	79.0	+4.7

Continuous casting capacity over the past decade increased dramatically.

A DECADE OF DISASTER FOR STEEL
Comparison of Financial Performance

Average	Sales	Profits	Crude Steel Production	Profit or Loss Per Ton Produced
	(Millions of Dollars)		(Millions of Net Tons)	(Dollars Per Net Ton)
U.S. (AISI Reporting Companies)				
1975-77	36,212	985	111.0	9
1978-80	52,334	1,389	112.3	12
1981-83	53,568	−1,389	77.4	−18
EEC (10 Companies)				
1975-77	22,932	−1,664	79.7	−21
1978-80	34,693	−2,552	82.2	−31
1981-83	25,506	−3,176	75.5	−42
Japan (5 Companies)				
1975-77	24,084	184	89.4	2
1978-80	33,242	864	86.9	10
1981-83	33,604	376	75.4	5
Canada (3 Companies)				
1975-77	2,685	181	11.7	15
1978-80	3,743	299	13.0	23
1981-83	3,897	107	10.9	10

Source: Bethlehem Steel Corp.

NOTE: The financial performance of major world steel producers has ranged from unacceptable to outright disastrous over the last nine years. Canadian companies have fared the best—benefitting from a closely monitored import market and practically unlimited access to the U.S. market. U.S. producers have been especially vulnerable over the last few years as surging levels of unfairly priced imports have eroded domestic prices, producing mounting losses.

It hasn't been easy for companies in the steel industry to make money.

cases and shut them out of the market completely."

Reagan Program

As in the past, the American trade situation was brought to a head in 1984 by the threat of complete exclusion, or at least, a very sharp reduction. U.S. producers had gathered considerable support for a legislated import quota. Numerous dumping and subsidy suits were nearing the action stage. Also calling for action in September was the injury case started by Bethlehem Steel and United Steelworkers of America.

In this case, the International Trade Commission recommended quotas for about two-thirds of the steel products. Other grades were omitted and the quotas for plates and structurals was so high they were almost meaningless.

No one was very happy with the ITC proposals, but they served the purpose of forcing the Reagan Administration to deal with steel trade issues a few weeks before the national election. Apart from political consequences, a complete dismissal of these issues could have brought on a legislated quota and would certainly have brought some tough rulings in the unfair trade cases.

In this situation, the Reagan Administration came up with a plan for restricting steel imports through voluntary bilateral agreements. Imports of finished steel would be limited to 18.5 pct of U.S. supply and another 1.7 million tons of semi-semifinished steel would be admitted.

In return, domestic producers agreed to withdraw their unfair trade suits on finished steel. Trade suits can and will be filed on semi-finished grades.

"We intend to file subsidy and dumping cases against semifinished," said Mr. Roderick.

U.S. Steel has been nothing if not flexible in its attitude toward semi-finished imports. When the trade agreement with Europe was being negotiated, Mr. Roderick reportedly argued strenuously for limits on semifinished products. When these weren't applied, U.S. Steel almost immediately made plans for bring-

"Over the long term the market has to pay a price for a product or you don't have a product,"
Donald Trautlein, chairman of Bethlehem Steel Corp.

ing forging slabs into the Fairless Works.

The initial Fairless plan fell through, and now Mr. Roderick plans to sue people for importing slabs. An interesting sidelight is that dumping duties and countervailing duties are paid by the importers of record. In the case of semifinished steel, the importers could very well be domestic steel companies.

California Steel, which used to be Kaiser Steel, has been set up to run on foreign slabs. With over 800,000 tons of semifinished imported in 1984, other domestic mills have to be using foreign material.

American steel producers would obviously have preferred a formal quota and a lower limit on imports, but some action was urgently needed and the Reagan program was considered a lot better than nothing. Imports captured 26 pct of the U.S. market in the first nine months of 1984 and went over 30 pct in individual months. Without government intervention, it's conceivable the foreign share would have gone to 40 or 50 pct.

The effectiveness of the voluntary program will depend on the will of the Administration. The President is "deadly serious" about the import limits, said Mr. Trautlein. "You certainly don't mistrust your President when he tells you face to face that he's committed to that program."

Nevertheless, it will take a good deal of doing to devise workable restraints. So far neither trade suits nor agreements have succeeded in eliminating excess production and competition in the world market.

Agonizing Ordeal

"The world steel industry has never before experienced in its history as a modern industry a more agonizing ordeal than it does today," said Yutaka Takeda, president of Nippon Steel Corp. and chairman of the International Iron and Steel Institute (IISI).

The problem remains one of not enough demand. According to IISI, Western World steel consumption of 438 million tons in 1984 will be up a little from 1983, but it will be well below the 1979 peak. Moreover, part of what appeared to be a consumption increase turned out to be inventory building by U.S. manufacturers early in 1984.

In any case, Western World steel capacity of about 600 million tons is about 150 million tons greater than demand. IISI looks for this imbalance to continue through the rest of the decade; the world operating rate will be more than 85 pct by 1990, the organization said.

There is a tendency to attribute steel problems to overbuilding by a mature industry serving mature economies. That is partly true, but some of the worst problems have arisen in the immature economies of developing nations.

"Apparent steel consumption in Latin America has suffered severe setbacks," said Lenhard J. Holschuh, secretary general of IISI.

At the same time, the developing countries have been under financial pressure to maintain steel output. "Recent estimates put the external debt of the developing countries at $608 billion in 1984, rising to $645 billion in 1985," said Mr. Holschuh. "The Third World's 1985 debt service payments will absorb one-third of its export earnings next year."

The fact that U.S. lenders are among those receiving debt payments has unquestionably added to the country's free trade constituency.

The net effect of all this was that the developing nations boosted steel production by 29 pct from 1979 to 1984—even though their own economies were weak. In the same period, the Western World market shrank by more than 10 pct. The developing world's share of the free market rose from 9.5 pct in 1979 to 13.7 pct in 1984.

The Reagan Program vs The Trade Bill

Comprehensive Fair Trade Program

1. The U.S. Trade Representative will engage steel export nations in negotiations designed to arrive at country-by-country arrangements or agreements that will be enforceable under our laws.

2. The Administration will introduce and support the prompt enactment of legislation that will make any such arrangements and agreements enforceable by Customs at our borders.

3. The objective of these enforceable arrangements and agreements will be imports of steel mill products, other than semi-finished steel products, of not more than 18.5% of apparent domestic consumption. For semi-finished steel products, the import level will be not more than 1.7 million tons, with the possibility of increased amounts if the steel industry operating rate is above 85%. Imports entered into this country on or after October 1, 1984 will be included in the imports covered by the Program.

4. The Government will obtain reaffirmation of existing unfair trade case arrangements and agreements previously concluded with the European Community, Mexico, and South Africa. Necessary action will be taken to assure adherence to the pipe and tube agreement between the European Community and the United States.

5. The arrangements and agreements will cover all steel mill products and will be product specific in order to maintain a product mix that is representative of historic patterns.

6. The Program will be for a period of five years and includes the presumption of renewals.

7. The Administration will use the authority of our laws to achieve the Program, including Section 301 of our trade statutes, the self initiation of antidumping and countervailing duty cases, and the full use of all of our fair trade powers to obtain the arrangements and agreements.

8. There will be a Cabinet-level monitoring group to review the arrangements and agreements reached and to monitor import trends on a quarterly basis to insure that the Program is realized.

9. The Administration will provide additional initiatives to assist the steel industry by making a comprehensive review of domestic tax, regulatory, and antitrust laws and policies, with a view to corrective changes in 1985. Furthermore, the U. S. Trade Representative will make new initiatives to eliminate restrictive and distortive trade practices against steel suppliers by foreign countries.

10. Unfair trade cases, except as to semi-finished steel imports, will not be filed against a country so long as there is satisfactory progress with respect to such country in achieving the Program.

International Trade Bill

Urges the President, through a non-binding resolution, to reduce the import share of all products in the domestic steel market to a range of 17 pct. to 20.2 pct.

Gives the President the authority to enforce voluntary restraint agreements through export licenses or the U. S. Customs Service.

Requires the domestic steel industry, as a condition for annual renewed import relief, to commit "substantially" all of the net cash flow from its steel operations to investment in facility modernization.

Requires the domestic steel industry to set aside 1% of its net cash flow for employee retraining.

Requires the U. S. Department of Labor to devise a plan within six months for the retraining and relocation of unemployed steelworkers unlikely to return to work in the industry.

The big loser in this sequence was the American steel industry. U.S. imports from the developing nations rose from 4 million tons in 1982 to 6.3 million tons in 1983 and to an estimated 10.5 million tons in 1984. These gains in depressed market had a murderous effect on domestic mills.

During the first two years of the recession, Japanese and European producers exercised voluntary or involuntary restraint. In 1984, however, Japan joined the party, boosting shipments to the U.S. by 80 pct in the first nine months of 1984.

Imports from Europe were up by a smaller amount—60 pct. With a 76 pct increase in third world shipments, the market sagged under a big inventory burden and there were angry protests from domestic producers.

Foreign mills have "opened the floodgates and are pouring steel into the U.S.," said Mr. Trautlein.

How to Control

Recent experience has provided some guidance on what kind of instruments are effective in closing the gates. Not very helpful are agreements that are vague, private and possibly non-existent.

The understanding which supposedly limited Japan's shipments to the U.S. is one example. This has often been treated as something firm and clearcut. In discussions of trade policy, it has been argued that the

Japanese and European agreements mean the U.S. was already controlling two-thirds of its steel imports.

However, no one ever knew if there was an agreement or what the terms were. "It's just something that is very vague," said Mr. Roderick.

"There hasn't been any agreement whatsoever to restrict the volume between Japan and the United States," said Minoru Kanao, president of Nippon Kokan (NKK). "We have been looking into past numbers on our own—on an individual company basis—and we have been discreet with our exports to the United States."

Asked about the 80 pct surge in Japan's U.S. exports, Mr. Kanao said it reflected the economic improvement. Speaking in October, he said the second half of 1984 would see the exports coming down.

"We have no intention of flooding the United States market with our steel," he said.

The good intentions of Nippon Kokan are now backed by a direct stake in the U.S. market. NKK now owns 50 pct of National Steel. The other owner, National Intergroup, recently revealed that it was merging with a West Coast distributor of pharmaceutical products.

"National told us they were going to merge," said Mr. Kanao. "The relationship between National Steel and National Intergroup will remain unchanged."

There are no immediate plans for changing NKK's position in National Steel. "At this moment, we have no idea of buying the other half," said Mr. Kanao.

Other Japanese steel companies are said to be looking at U.S. investments, and the establishing of multinational ties may ease trade pressures in the future. Right now, governmental restraints are considered necessary.

What Works

The European agreement illustrates the kind of restraint that works and the kind that doesn't. On most major products, the agreement provides specific limits and monitoring procedures. Steel exports to the U.S. must be licensed by the Common Market. Under special legislation, the U.S. can turn back shipments that violate the agreement.

The Europeans have complied with this portion of the agreement. They haven't complied with the portion which provides a specific limit for tubular products but has no monitoring or enforcement provision. Tubular shipments have gone through the roof. Imports from sources have taken over nearly 70 pct of the oil country seamless market.

A third portion of the European agreement dealt with a number of minor products by saying there should be consultations if the specified limits weren't respected. Needless to say, this has proved to be just another example of American innocence in the grown-up world.

The agreements called for under the Reagan program are supposed to have licensing procedures. Enforcement authority has been provided by recent legislation.

The question, of course, is whether Japan and the developing countries will go along with effective restraints. U.S. producers say they have the goods on all countries in trade suits.

"There's plenty of leverage for all of them," said Mr. Trautlein. "There are plenty of ways. What there hasn't been is the will."

The U.S. government is now apparently willing to intervene in steel trade. In securing this willingness, U.S. producers could have invited an elephant into their tent. The new trade bill calls for steel companies to plough back steel earnings and provide funds for retraining.

These are considered innocuous provisions, but they do suggest the quid pro quo for trade protection will be suspicious surveillance of steel company actions. In October, Mr. Roderick noted some of the items under consideration for the trade bill.

"They're going to monitor price behavior and they're also going to monitor employment costs," he said.

With steel prices behaving so badly and with President Reagan in office, the question of jawbone control is academic. If steel companies are ever able to restore prices, however, you can be sure there will be cries, that trade protection has led to non-competitive actions by domestic mills. □

"The world steel industry has never before experienced in its history a more agonizing ordeal than it does today,"
Yutaka Takeda, president, Nippon Steel Corp. and Chairman of IISI.

Big and Basic

With all the troubles of the world steel industry, people sometimes lose sight of two important points.

First, the steel market is enormous. Over 710 million tons of steel will be consumed in the world in 1984. Western World consumption will be 441 million tons and the U. S. will consume 94 million tons (metric).

The second point is that steel is basic. It's basic because it costs less than other materials. This fact was touched on by Yutaka Takeda, president of Nippon Steel Corp. and chairman of IISI.

Mr. Takeda compared steel with other materials on the basis of "price relative to specific strength."

"In the case of steel," he said, "this is 8 cents, whereas for aluminum, it is 29 cents; for ceramics, it is 30 cents; for carbon fiber, it is 38 cents; and for titanium, it is $1.25."

"...we may safely say and expect that steel will continue to command an unshakeable position as the basic industrial material...," said Mr. Takeda.

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February 1, 1985

IRON AGE METALS PRODUCER

ELECTRIC FURNACE

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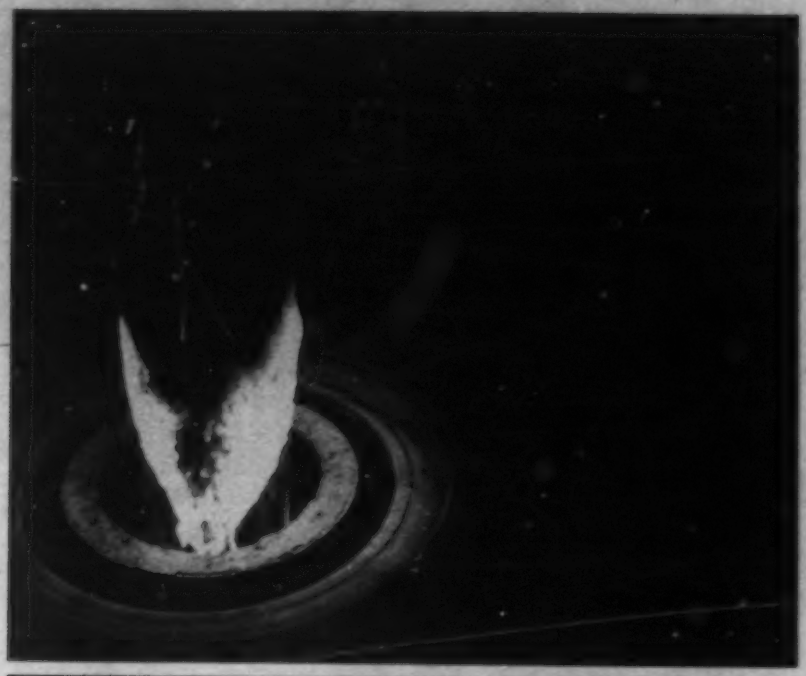
FEBRUARY 1, 1985 VOL. 228, NO. 3

IRON AGE METALS PRODUCER



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IRON AGE (USPS 369-790) is published 24 times a year by CHILTON COMPANY, Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, PA 19087 and additional mailing offices. IRON AGE is sent on a controlled free basis to qualified managers in U.S. metalworking companies. All others: Manufacturing Management edition—$42 one year, $69 Canada/Foreign (24 issues). Metalsproducer U.S. edition—$24 one year (12 issues). Metalsproducer International edition—$27 one year (6 issues). Single copies, $2.50. Cable Chilton Philadelphia.
Send address changes to IRON AGE, P.O. Box 1440, Riverton, N.J. 08077.

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ELECTRIC FURNACE REPORT:

A PIPELINE FULL OF TECHNOLOGY

Technology Changes In Arc Furnace Steelmaking

Change	United States	Japan
Up-powering	Values over 0.6 MVA MT	Yes
Oxy-fuel burner use	Limited	Yes
Scrap preheating	No	Yes
Power cable cooling	Yes	Yes
Slag door/tapping spout weight reduction, water cooled elec holder	Yes	Yes
Bucket vacuum refining	Limited	Yes
Arc shielded welding	Yes	Yes

With the whole steel market expected to lag over the rest of the decade, the electric furnace surplus is likely to continue.

BY GEORGE J. MCMANUS

The electric furnace faces a new challenge.

The challenge is to continue making technical progress with little or no expansion of capacity.

Dramatic progress in the last fifteen years has been accompanied by rapid expansion. In 1981, alone, thirteen new arc furnaces came on stream.

The construction spree lifted electric furnace capacity to about 50 million tons. That compares with a market of 20 to 30 million tons in the last three years.

With the whole steel market expected to lag over the rest of the decade, the electric furnace surplus is likely to continue. There will probably be some further displacement of blast furnaces, but to a large extent, electric furnace activity will have to be based on replacement and modernization.

It has always been difficult to justify replacement spending in the steel industry. Without the prospect of added volume, few projects have been considered attractive.

Happily, the electric furnace pipeline is filled with a great amount of exciting, compelling technology. For existing furnaces, there are water cooled walls, oxy-fuel burners, computerized controls and other advances.

Furnace builders say production rates can be doubled with relatively modest investments. Payback periods of a year or so are cited.

In addition, a number of completely new processes are being tried. The direct current furnace is now getting a production scale test in the U.S. Continuous steelmaking has surfaced again. In Europe two plasma furnaces are being operated.

It will be some time before economic and technical questions on these processes have been evaluated. There are those who doubt that the conventional arc furnace will be seriously challenged.

There are questions, but the potential in the new technology is too great to be ignored. With conventional combustion or electricity, the highest temperature achievable is 3,500°C. With plasma, temperatures over 15,000°C. can be generated.

It has been suggested that the intense heat of plasma could be used to make steel refine itself. The components of iron ore would simply be distilled off.

No one is trying to exploit the more exotic possibilities of plasma just now. On the other hand, no one in the metals business can afford to ignore a process that could bring on a whole new technology.

None of which means there is a concerted rush to upgrade electric furnaces. Except for the related field of ladle refining, things are slow. But there is the economic and technical basis for continued progress.

World Steel Production By Process

Source: Airco Carbon

Year	Steel Production, (Millions of Metric Tons)		
	Total	Hot Metal Processes	Electric Furnace
1975	643.0	531.8	111.2
1976	675.4	554.1	121.3
1977	669.7	543.1	126.6
1978	716.7	569.5	147.2
1979	745.3	584.1	161.2
1980	711.6	552.5	159.1
1981	704.0	543.7	160.3
1982	643.1	495.2	147.9
1983 Preliminary	663.0	510.8	152.2
1984 Estimate	704.3	537.8	166.5
10-Year Average	687.6	542.3	145.4

Electric furnace share of *world* steelmaking has risen from 17.3 per cent in 1975 to an estimated 23.6 per cent today.

PROFILE OF A SYSTEM: There is close coordination in the B&W complex, but the individual operations are still controlled separately.

In February of 1984, Babcock & Wilcox began operating a new steel complex at Koppel, Pa.

This included an 80-ton, UHP Krupp arc furnace with a 19 foot diameter; a Midland-Ross ladle furnace; and a four-strand Mecan Arbed-Ksw bloom and bar caster.

The 80-ton furnace has produced heats in as little as 62 minutes tap-to-tap. This speed reflects radical changes in the function and design of the modern electric furnace. The new role is explained by Lowell S. Gonano.

"You melt scrap," said Mr. Gonano, of Babcock & Wilcox. "You blow your oxygen. You superheat it and tap it. What you're doing there is melting fast.

"Then we reladle so that the furnace slag isn't going into the ladle furnace. Your ladle furnace is where you concentrate on producing a specific analysis-temperature, deoxidation.

"So you've got the best of both worlds. You've taken the tedious tasks, which it couldn't do very well, away from the arc furnace. You've put them over in a furnace where you can precisely control everything."

By precise, Mr. Gonano means chemistry "right to the point. And if I want 2,875°F for the caster, I've

got 2,875. There's no surprise up there."

As this suggests, the role of the arc furnace is being changed by ladle refining. The furnace, itself, is being changed by ultra high power, water cooling and other innovations.

All this adds up to a furnace so fast and powerful manual control is difficult or impossible.

"That's like taking a man who learned to fly a Piper Cub and throwing him in a Mach Two airplane," said Mr. Gonano. "He's going to have a helluva time keeping up with it. And with these big transformers you're putting on furnaces these days, you could melt the shop down if you weren't careful."

The Krupp furnace at B&W has a computer control that does more than generate information.

"This one runs the furnace," said Mr. Gonano. "The man doesn't run it. He puts it on automatic and away it goes. The computer controls the tap settings. It has sensors on all the panels. It has sensors in the roof and as long as you're running a good, foamy slag, that thing will stay on pretty high current.

"If something goes astray and one side gets a little hot, the computer knocks the tap down. That's a very good feature on our furnace."

The Krupp control system was developed at that company's Siegen Geisweld plant where a 122-ton furnace set a record of 20 heats in one day. The control is the adaptive, dynamic type.

"The kilowatt hours and time needed to finish a heat are updated and displayed every 10 seconds," said Heinz Gremme, manager of process automation for Krupp Stahltechnik.

"We have at Babcock & Wilcox a historical data base," continued Mr. Gremme. "It provides the operator with access to the schedules. The ladle refiner operator can look into the caster schedule as well as the furnace schedule.

"He gets the data on where they are just now. If the computer predicts they will need another 10 minutes to do a heat, he doesn't have to do all this phone calling."

There is close coordination in the B&W complex, but the individual operations are still controlled separately. "The next step would be to combine all that in a planning algorithm," said Mr. Gremme.

CONVENTIONAL R&D: Tending to discourage applications of any technology is the amount of electric furnace capacity in place.

"What the steel industry needs now is to optimize what they have," said James W. Brown, director of market development, Electrode Systems Division, Union Carbide Corp.

Mr. Brown has more than a passing interest in electric furnace technical trends; Union Carbide supplies electrodes that would be displaced by some new processes; but it does seem logical to make use of existing technology before deciding new technology is better.

Tending to discourage applications of any technology is the amount of electric furnace capacity in place. "I would say it's around 48 to 50 million tons," said Mr. Brown.

That's well above 1984 electric furnace production of about 30 million tons. The surplus has registered in the equipment market.

"As far as new electric furnace business, it's slow," said William J. Bottomley, executive vice president and general manager, Lectromelt Corp. "What we see in general is the emphasis on upgrading and improving efficiencies, improving quality capabilities."

There may be some emphasis on upgrading, but furnace builders don't think melt shops are taking full advantage of the opportunities available through modernization. Mr. Bottomley speaks of getting from one furnace the same output that had been coming from two.

Others agree. A lot of the U.S. electric furnaces are 10 to 15 years old, said Ralph M. Smailer, manager of electric arc furnaces for the Swindell Furnace Division, Davy McKee Equipment Corp.

"Almost half are suitable for upgrading," said Mr. Smailer. "On any of the these furnaces, you can look at doubling output."

He cited the experience of Lukens Steel, which was able to get a 70 pct furnace increase through modernization. Mr. Brown said the various innovations translated into another 10 million tons of electric furnace capacity.

One way of boosting output is to relieve the arc furnace of refining chores by installing a ladle system. This approach has produced 35 pct gains for Japanese furnaces that were good to start with, said Mr. Smailer.

Swindell supplies the ladle technology of Daido Steel. The company recently received a contract from U.S. Steel for a ladle system at Gary Works.

Lowell Gonano of B&W noted that some operators balk at the cost of ladle systems. "I'll tell you: once you've got one running in there, it's saving you money every day," he said.

Daido's process control for arc furnaces is now being supplied by Bricmont & Associates and is going in at Cascade Steel Rolling Mills, Inc., McMinnville, Ore.

"We have data from the Japanese where they have reduced electrode consumption 10 to 25 pct," said F.H. Bricmont, chairman of The Bricmont Company. This was on furnaces that had low consumption before, said Mr. Bricmont. Reduced graphite consumption means reduced power consumption, he said.

Mr. Brown of Union Carbide noted that economic justifications of new processes have used electrode consumption of about 10 pounds per ton of steel for conventional furnaces.

"If you take the better run, more modern operations today, you will find they are getting electrode consumption on the order of 6 to 7 1/2 pounds a ton," he said.

Studies by Airco Carbon showed that from 1970 to 1983, U.S. electrode consumption fell from 13.6 lbs per ton to 10.2 lbs per ton. How-

ever, there are 15 U.S. furnaces with consumption below 8 lbs per ton. In Japan, the average is 8 lbs and some furnaces go below 4 lbs per pounds.

Nearly half the improvement has been due to better electrodes, Airco Carbon said. The company noted that neither the Japanese nor the U.S. numbers had yet reflected the benefits of water cooled or coated electrodes.

Water cooled electrodes haven't caught on so far in the U.S. One reason may be the advent of protective coatings. Nalco Chemical Co. reports that its coating can reduce graphite consumption 9 to 15 pct.

The benefit of water cooled furnace roofs and side walls are now generally accepted. "It's almost standard practice," said C.H. Freudenrich, sales manager for Blaw-Knox Equipment. "All plants are going to have it if they have the water available."

Oxy-fuel burners are finding limited use in the U.S. In June of 1984, Empire-Detroit installed an oxy-fuel system on its number 8 furnace at Mansfield, Ohio. The system was supplied by Korf Technologies and Air Products and Chemicals, Inc.

In the first three months of operation, the furnace with three burners outproduced a comparable furnace by 15 pct. Electrical consumption was reduced by about 40 kwh a ton. A slight increase in electrode consumption was expected to be minimized with more experience.

Foamy slags are being used to protect furnace sidewalls from arc radiation. By injecting carbon and combining it with oxygen, a foam a foot or more thick can be formed.

Direct reduced iron, with its oxygen and carbon content, provides a ready-made source of the foaming action.

While most of the current activity involves the upgrading of existing furnaces, there are some complete new furnaces in the picture. The 80 ton Krupp furnace at B&W came on stream in early 1984. Scheduled for startup in October of 1985 is the Krupp furnace at Timken's Faircrest greenfield plant.

CONTINUOUS STEEL:

At the new Babcock and Wilcox Shop, 80-ton heats have been turned out in a little over an hour.

At the electric furnace conference in Toronto, a paper on continuous steelmaking was presented by John A. Vallomy, president, Intersteel Technology, Inc.

Mr. Vallomy said his concept could boost productivity 150 pct and could reduce capital costs as much as 50 pct.

These comments were received with interest. Electric furnace people indicated they would look forward to data from a demonstration plant.

The idea of continuous steelmaking isn't brand new. In France, IRSID worked for years on a continuous process. There was an extensive program in Australia.

Nothing came of these projects. "You can almost make steel in a continuous process," was the comment of one engineer. To make the different steel grades, you had to go to some kind of batch treatment, he indicated.

Nevertheless, continuous steelmaking is coming close to reality. The speed with which the new high powered furnaces make steel is starting to approach continuity. At the new Babcock & Wilcox shop, 80-ton heats have been turned out in a little over an hour.

Lowell Gonano of B&W is still happy to have a batch refining ladle between the furnace and the continuous caster. "Steel mill equipment takes a lot of abuse," said Mr. Gonano. "The more technical pieces you put on it, the more things that can go wrong.

"Maybe I'm old fashioned," he continued, "but somewhere you have to allow batches to occur so you can take 10-minute or a one-hour breakdown and not screw the whole place up for the day. I can absorb an hour downtime and not have a catastrophy."

Increased use of direct reduced iron would favor continuous steelmaking. "With DRI, you're charging a known chemistry and its physical form lends itself to continuous charging," said Mr. Bottomley of Lectromelt. "You can maintain a foamy slag; you have a certain amount of iron oxide and a certain amount of carbon in the product."

The metallized pellets can be continuously charged, he explained. The known chemistry makes it possible to predict end points and minimize refining.

Mr. Bottomley was formerly with Oregon Steel. "Not too many people are aware of it," he said, "but there was an experiment at Oregon Steel some years ago on continuous steelmaking.

At that time, Oregon Steel was using reduced iron. "The actual process was one of melting DRI in a furnace on a continuous basis," said Mr. Bottomley. "The steel was decarburized continuously and then went into a holding furnace.

"The difficulties were in the holding furnace. Holding low carbon steel is a difficult task. It's difficult from a refractory standpoint. This particular experiment employed an induction furnace as a holding furnace and that was the weak link."

There were problems, but the main difficulty, Mr. Bottomley indicated, is that natural gas prices have worked against direct reduction in the industrialized world.

"If DRI were readily available and economically competitive with scrap," he said, "I'm sure someone would figure out a way to achieve long runs with continuous melting. It's not that far away."

DIRECT CURRENT:

What needs to be shown is that the DC concept is practical for making steel on a production basis.

Scheduled for startup in early 1985 (or late '84) is a direct current furnace at the Darlington, S.C., plant of Nucor Corp.

If results are favorable, the impact could be enormous. "The main advantage is reduced graphite consumption," said Ernest G. Mueller, manager applications engineering, BBC Brown Boveri, Inc. "This is about half or more than half."

Brown Boveri and the American Bridge division of U.S. Steel are supplying the direct current furnace to Nucor. Assuming 8 to 10 pounds of graphite per ton of steel in an AC furnace, Mr. Mueller's consumption estimate translates into a saving of more than $8 a ton with direct current.

The saving stems from the switch from three electrodes with alternating current to one electrode with direct current. The DC furnace has higher capital costs, but the net saving can still be significant.

What needs to be shown is that the DC concept is practical for making steel on a production basis. Brown Boveri's experience has been on a 15-ton prototype furnace at a foundry in the Buschhutten Works of SMS Schloemann-Siemag AG.

At Avesta in Sweden, a 50-ton specialty steel furnace was converted to the direct current process of Krupp and ASEA. This would have provided some answers, but Avesta has gone back to AC operation. An ASEA DC furnace with a hollow electrode is being used for ferrochrome.

There could be another installation soon—in the U.S. "We're working on a project," said Patrick Hanley, manager of steelmaking for ASEA Metallurgy.

At the moment, however, everyone is waiting to see what happens at Nucor. Brown-Boveri and American Bridge are encouraged by results on the 15-ton foundry furnace.

"The experience has been very good," said Mr. Mueller. "It really confirms our expectations. It did prove the reliability of the concept."

Full confirmation will only come when the larger (35-ton) more powerful (37.5 kilowatts) furnace at Nucor is in operation.

"We're looking to evaluate bottom life on the basis of mini-mill operation as opposed to the discontinuous foundry operation," said Joseph F. Kroker, manager of mechanical products for American Bridge.

"At Darlington, we expect to operate a minimum of 15 turns a week," said Mr. Kroker. "At the foundry we would operate only one turn a day and then only three or four days a week."

In the Brown-Boveri design, the bottom electrode or anode is formed by a large number of pins which are mounted on horizontal plates and which extend up through the hearth lining to the melt. The system is air cooled.

In the ASEA-Krupp system, the bottom electrode is a large copper plate which covers about the same area as the melt at the slag line. Current passes through the bottom refractories to the plate.

Apart from reducing graphite consumption, the single electrode furnace eliminates the need for flicker compensation.

"At the incoming, we have a balanced three-phase load," said Mr. Mueller of Brown Boveri. "The DC arc is stable. It does not extinguish." In an AC furnace, there is constant striking and breaking of arcs.

"Once a flat bath is reached, there is a very marked reduction in noise," said Mr. Kroker. "It's very quiet. Refractory erosion is much more uniform," he added.

"With one electrode in the center, you have no hot spots," explained Mr. Mueller.

Maintenance is reduced and pollution control is simplified. "You have only one opening in the roof," said Mr. Kroker.

PLASMA:
The word plasma, can refer to any gas that is conducting electricity.

Plasma furnaces are now operating at Voest-Alpine in Linz, Austria, and at the Siegan Works of Krupp Stahl, AG.

The 45-ton, DC furnace of Voest-Alpine was started in November of 1983 and has been in service since then. Krupp has a three-ton, three-phase, AC furnace and has plans for a 10-ton unit.

The Voest program has given promising results. "We think it has been very successful," said Hansjorg Wohlkonig of Voest.

"The main application we see for the moment is in producing quality steel grades," said Dr. Wohlkonig. "The advantage for quality steel is the higher metallic yield. Because of the inert argon atmosphere in the furnace, you have much less of the expensive alloying elements burning off."

He compared chromium yield of 97 pct with plasma to 85 pct with conventional arc melting.

The inert atmosphere can also eliminate the need for ladle degassing, said Wolfram Jung of Krupp Steel. There is an environmental advantage, Mr. Jung added.

"The plasma furnace burns not so loud," he said.

"It's very quiet compared to the arc," said Dr. Wohlkonig. The noise range of 80 to 90 db's with plasma is well under the 120 db's for arc furnaces, he noted.

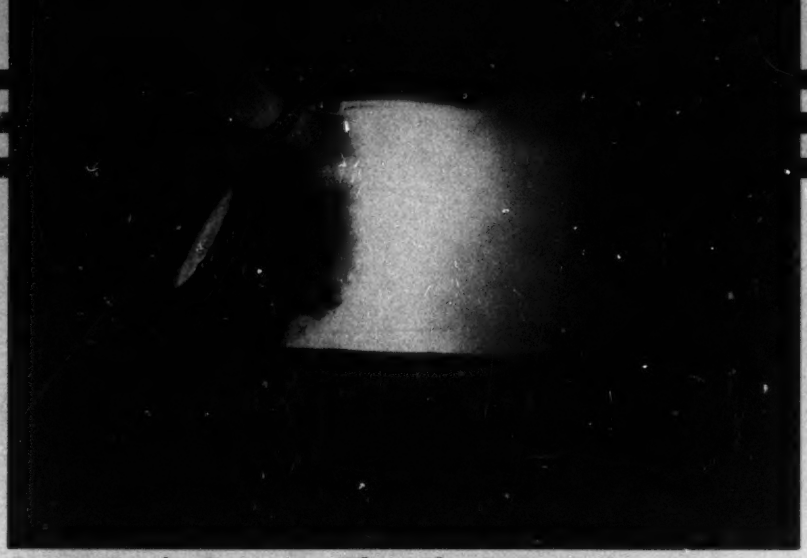
Closely related is the stability of plasma. "You don't have the constant short circuits," said Dr. Wohlkonig. "You don't have any shock loads."

This eliminates the need for flicker compensating equipment. In countries where the electrical grid is weak, the furnace power can be higher than with a conventional furnace.

In the Voest system, four plasma torches are mounted in the sides of the furnace and are aimed at the furnace bottom. "The plasma furnace is essentially an electric arc furnace without graphite electrodes," said Dr. Wohlkonig.

"These are replaced by plasma burners," he continued. "The cathode consists of a piece of tungsten, which wears out. We have a bottom electrode in the hearth." (Krupp's AC furnace has no bottom electrode.)

To get an economic comparison, Dr. Wohlkonig converted plasma



Bottom Tapping Furnaces—Where They're Located

1. Thyssen,	Germany	55 ton, 17 ft. dia.	36 MVA	CBT
2. Thyssen,	Germany	120 ton, 22 ft. dia.	75 MVA	CBT
3. DDS,	Denmark	120 ton, 22 ft. dia.	70 MVA	EBT
4. Elkem Spigerv.,	Norway	60 ton, 17 ft. dia.	45 MVA	CBT
5. Oregon Steel,	USA	85 ton, 19 ft. dia.	48 MVA	EBT
6. DDS,	Denmark	120 ton, 21 ft. dia.	66 MVA	EBT
7. SAFE,	France	135 ton, 22 ft. dia.	96 MVA	EBT
8. Raritan River Steel,	USA	165 ton, 20 ft. dia.	93 MVA	EBT
9. CAP,	Chile	25 ton, 12 ft. dia.	5 MVA	CBT
10. Berliner Works,	Germany	45 ton, 15 ft. dia.	24 MVA	EBT
11. SISMA,	Italy	70 ton, 19 ft. dia.	42 MVA	EBT
12. ALPA,	France	72 ton, 17 ft. dia.	45 MVA	EBT
13. British Steel,	England	180 ton, 24 ft. dia.	85 MVA	EBT
14. Thyssen,	Germany	155 ton, 22 ft. dia.	80 MVA	EBT
15. Cosigua,	Brazil	130 ton, 21 ft. dia.	85 MVA	EBT

EBT = Eccentric Bottom Tap
CBT = Concentric Bottom Tap
Source: Mannesmann Demag

costs to graphite terms. "You don't have any graphite consumption obviously," he said, "but you do have consumption of argon and of tungsten cathodes. You come to the equivalent of three kilograms per ton (of graphite electrode)."

That's about the same as the graphite consumption with a conventional furnace, he indicated. He was hopeful the plasma cost could be cut to a 1.4 kg equivalent.

The energy efficiency of plasma has been questioned on the basis of high radiation losses. Kr. Wohlkonig discussed the experience of Voest.

"We have an average of 600 kwh a ton," he said. "That is for doing all the metallurgical work—meltdown and refining. If you're talking about meltdown, we've reached values of 460 kwh. I think 460 compares quite well with conventional."

At this stage, Voest doesn't see plasma matching the speed of conventional furnaces on carbon steel. "If you're talking only carbon grades, the productivity of the furnace isn't yet at a level comparable to a modern ultra high power furnace."

For meltdown alone, the Voest furnace produced at the rate of about 20 tons an hour. Full refining would, of course, reduce output.

With intermittent operation, lining life has been running around 120 heats. Tests with sustained operation have indicated 220 heats can be expected.

Voest has reported a plasma burner life of 2,000 hours. "The wear of the plasma torch is improving," said Dr. Wohlkonig.

The word, plasma, can refer to any gas that is conducting electricity. ASEA now uses the phrase, DC Arc Plasma, for its single elecrode furnace. A conventional arc furnace makes plasma.

A number of new processes are employing plasma for iron making. Westinghouse Electric Corp. has been involved in programs for direct reduction and melting of iron.

ECCENTRIC BOTTOM TAPPING: Outside the U.S. there are thirteen electric furnaces with bottom tapping.

Coming up in the near future at Raritan River Steel Co. and Oregon Steel Mills are furnaces equipped for Eccentric Bottom Tapping (EBT).

Supplied by Mannesmann Demag Corp., EBT simplifies furnace construction and helps keep furnace slag from carrying over to the ladle.

Outside the U.S., there are thirteen electric furnaces with bottom tapping. Four of these employ the original design, which calls for tapping through a hole in the center of the bottom. This design reduces capital cost but it makes for slag carryover because of vortexing and because the flow can't be checked by tilting the furnace.

To get away from these problems, Mannesmann Demag shifted the tap hold to the rim of the bottom and provided a water cooled flap. In operation, the furnace is tilted 5 degree before opening the tap hole. Tapping is terminated by tilting the furnace backward and leaving a heel of 10 to 15 tons.

After tapping, the hole is cleaned with oxygen, the flap is closed and the hole is filled with a breeze material.

Advantages cited by Mannesmann Demag include reduced nitrogen pickup due to a short, compact stream; reduced temperature loss; and longer life for ladle refractories. These and other benefits are seen cutting operating costs by at least $4 a ton. □

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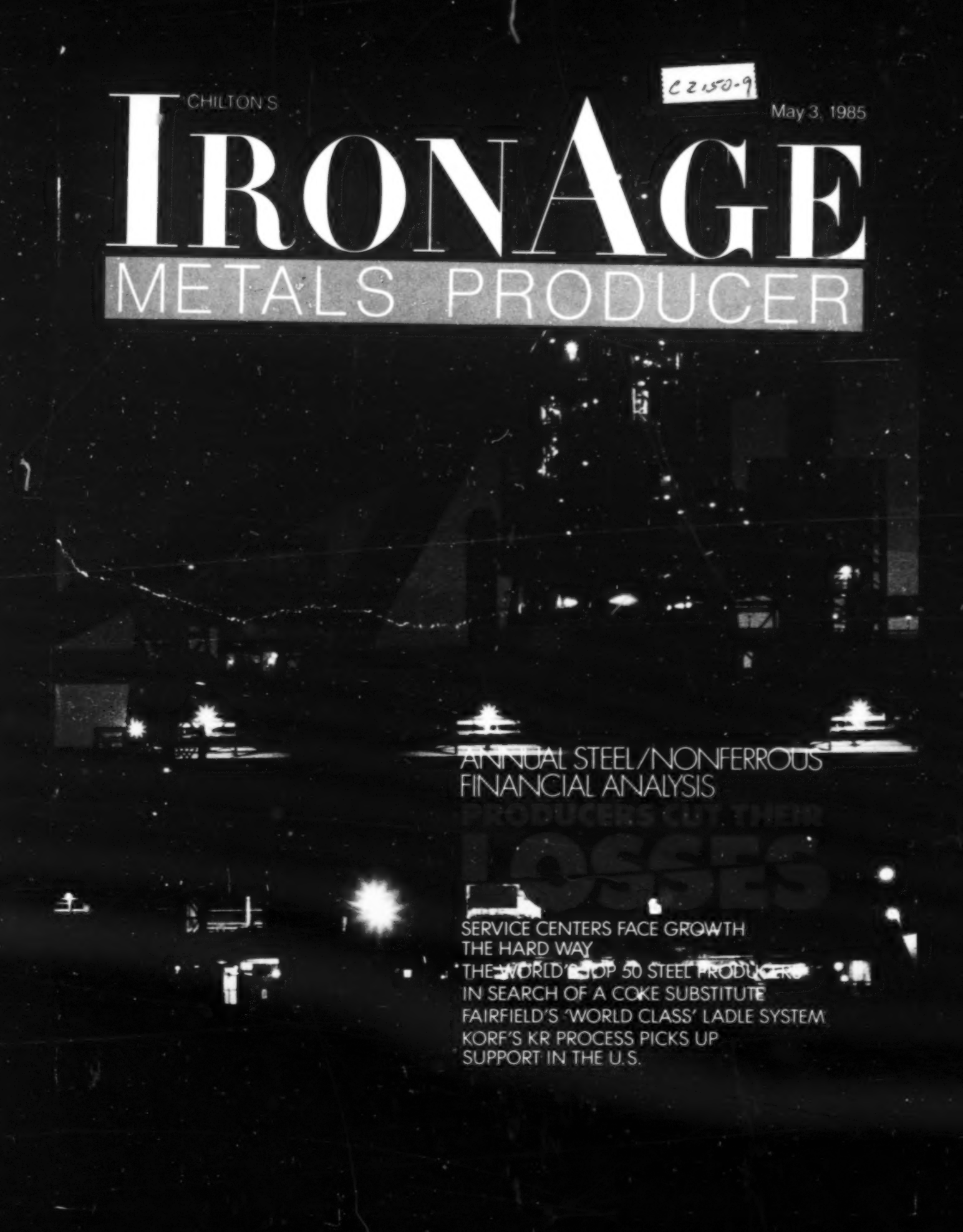
May 3, 1985



ANNUAL STEEL/NONFERROUS FINANCIAL ANALYSIS

PRODUCERS CUT THEIR LOSSES

SERVICE CENTERS FACE GROWTH THE HARD WAY

THE WORLD'S TOP 50 STEEL PRODUCERS

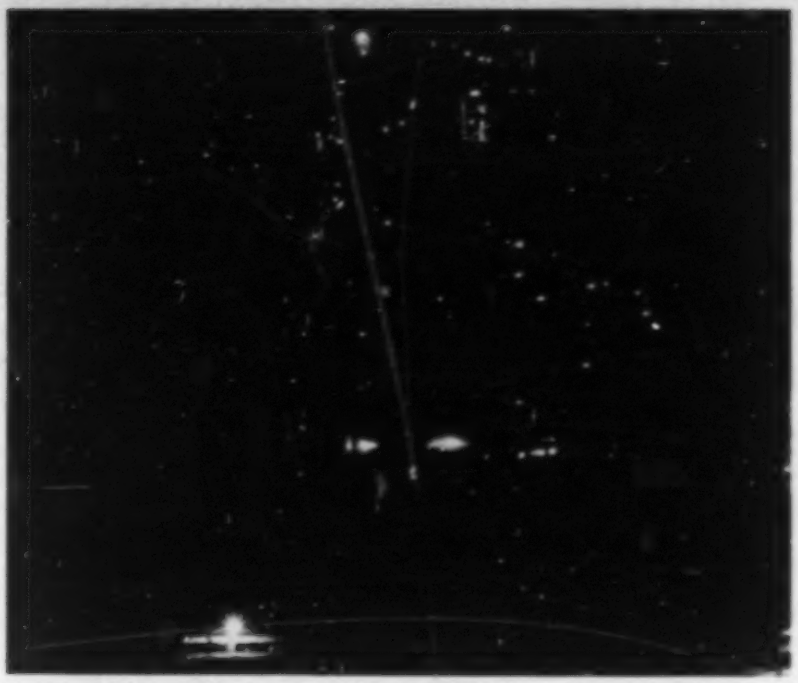
IN SEARCH OF A COKE SUBSTITUTE

FAIRFIELD'S 'WORLD CLASS' LADLE SYSTEM

KORF'S KR PROCESS PICKS UP SUPPORT IN THE U.S.

MAY 3, 1985 VOL. 228, NO. 9

IRON AGE



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IRON AGE (USPS 269-780) is published 24 times a year by CHILTON COMPANY, Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, PA 19087 and additional mailing offices. IRON AGE is sent on a controlled free basis to qualified managers in U.S. metalworking companies. All others: Manufacturing Management edition—$42 one year, $69 Canada/Foreign (24 issues); Metalproducer U.S. edition—$24 one year (12 issues); Metalproducer International edition—$27 one year (6 issues). Single copies, $2.50. Cable Chilton Philadelphia.
Send address changes to IRON AGE, P.O. Box 1440, Riverton, N.J. 08077.

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IRON AGE'S 1984 TOP 50 WORLD STEEL PRODUCERS

BY JAMES B. POND

Our annual survey reveals that overcapacity is still a problem but that it is not a deterrent to efficiency or to modernization programs.

Words and pictures do not tell the story of the plight of the world's steel industry as well as the statistics do in laying the facts on the table for all to see.

Statistics can lie, of course, or can be made to misinform. However, no matter how one looks at the results of *Iron Age's* annual survey of the world's top 50 steel producers, the message is a tragic one filled with despair and frustration but also one with images of hope.

To begin with, world crude steel output rose to 710 million metric tons in 1984, according to the International Iron and Steel Institute (IISI). This was 46.7 million metric tons higher than that of 1983, a rise of 7 pct. The figures are preliminary, of course, and include the estimated production of the entire world.

For clarification and to establish perspectives, the *Iron Age* survey is of the large steel producers in Europe, the Orient, and the Americas. Production in the USSR and Comecon countries, and China are not included in the 1984 survey.

According to the IISI, the 710 million metric ton figure is 10.0 pct higher than 1983 and 4.9 pct below the previous peak of 746.7 million metric tons reached in 1979.

The IISI stated that much of the increase came from the developing countries "whose 1984 production rose to an all-time high of 70 million metric tons or 28.3 pct above their 1979 level."

The industrialized countries of the Western World produced 375.6 million metric tons in 1984, up 9.3 pct over 1983, the IISI year-end report said.

Overcapacity Prevails

Whether it be overcapacity or insufficient demand for steel, clearly the world's steel producers could supply a much larger market without difficulty. What better demonstration of this can be offered than a look at what I call the " The Least Fortunate Producers." This listing shows that twelve of the top 50 firms were running at 60 pct or worse utilization, on average, during 1984. The worst case was Bethlehem Steel in the U.S., which reported a 49.5 pct utilization factor.

Was this true? Not necessarily. How does one report maximum capacity or capability to produce steel? *Iron Age* has for the second year defined it as "The tonnage capability to produce raw steel for a sustained full order book," which was suggested by one of the top ranked steel companies several years ago and which has not been questioned by any respondents.

Nevertheless, capability is subject to interpretation and must be judged accordingly.

Utilization Is A Key

On the more positive side, there were nine of the top 50 companies that achieved 90 pct or better utilization of their facilities. Two companies reported that they actually produced more than their capacity, which seems contradictory if not downright impossible. At least on the surface. If maximum capacity, for example, is determined on a 48 or 50 week year, it would be possible to run additional production rather than shut down for maintenance. For comparative purposes, I rated each of these firms at 100 pct utilization.

Another sign of the times is evident in the listing of "The Most Fortunate Producers Based on Highest Utilization." Most are well below the ten million tons per year mark.

On the other hand, those firms that are considered "Least Fortunate" are also the leaders of the world steel industry, both in size and technology.

Nippon Steel, the world's leading producer of steel with a capability to produce 53 million metric tons of steel each year was running at 55.5 pct of capacity during 1984, on average.

This parallels the Japanese experience during 1984. The five Japanese steel producers listed in this "Least Fortunate" category had a capacity to produce 122 million metric tons of raw steel, but produced only 67.5 million metric tons for export and domestic use, for a 55.3 pct utilization factor. What frustration this must be for the workers, owners and government. Here they have gathered together the best technology, equipment and facilities in the world and the world market for steel collapses.

Rating The Best

Top production honors for "Most Tons Produced Per Employee" goes to a newcomer to *Iron Age's* survey: Tokyo Steel Manufacturing Co., Ltd. This producer is highly automated. It produced 2,896,000 metric tons in 1984 with only 1,974 employees engaged in steelmaking operations, for an amazing 1,467 tons per employee. In 1983 Tokyo Steel produced 1,358 tons per employee, according to the company.

Comparisons of "Tons Per Employee" have proved to be an illusive task due to the need to interpret who is engaged in steelmaking operations. In past surveys attempts were made to separate manufacturing and service operations of large multi-industry firms. Quite a num-

(Continued on p. 77)

World's Top 50 Steel Producers in 1984

1984 Rank	(1983 Rank)	Company (Country)	Year	Crude Steel Production (metric tons)	Maximum Capability (metric tons)	Exports As % of Shipments	No. of Employees (Steelmaking)	Tons per Employee	Capital Expenditures 1985 Forecast 1984 Actual (Millions)
1	(1)	Nippon Steel	1984	29,420,469	52,973,000	34.0	64,205	458	Yen 155K F1
		(Japan)	1983	26,852,802	54,514,000	36.0	64,100	419	Yen 170K F1
2	(2)	U. S. Steel	1984	13,680,000	22,800,000	1.0	33,360	386	$1,350
		(U.S.A.)	1983	13,440,000	28,409,000	1.0	44,559	301	$970
3	(4)	Finsider	1984	13,517,476	21,445,000	31.3	81,610	166	L 906.9K
		(Italy)	1983	12,165,039	21,617,000	32.5	94,130	129	L 542.3 K
4	(3)	British Steel	1984	13,400,000	21,400,000	27.9	50,700	264	£220 F1
		(England)	1983	11,700,000	21,200,000	26.9	56,100	209	£193 F1
5	(5)	NKK(Nippon Kokan)	1984	12,504,000	21,030,000	32.0	24,754	505	Yen 125K
		(Japan)	1983	11,411,000	21,030,000	33.0	25,337	450	Yen 103K
6	(10)	Thyssen Stahl	1984	11,740,000	N.A.	N.A.	N.A.	N.A.	N.A.
		(W. Germany)	1983	10,036,000	N.A.	N.A.	N.A.	N.A.	N.A.
7	(9)	SIDERBRÁS[1]	1984	11,389,000	12,577,000	35.3	49,198[2]	232	$1,629
		(Brazil)	1983	9,119,000	10,275,000	40.0	43,133[3]	211	$1,457
8	(7)	Sumitomo Metals	1984	11,302,602	21,680,000	39.4	27,748	407	Yen 80K F1
		(Japan)	1983	10,338,586	21,680,000	37.7	28,784	359	Yen 90K F1
9	(6)	Kawasaki Steel	1984	11,283,000	20,780,000	36.5	26,976	418	Yen 100K F1
		(Japan)	1983	10,358,000	20,780,000	38.9	28,037	369	Yen 120K F1
10	(8)	Bethlehem Steel	1984	9,699,725	19,636,019	1.0	33,927	325	$400
		(U.S.A.)	1983	9,699,725	19,636,019	1.0	35,052	277	$309
11	(11)	USINOR	1984	9,400,000	13,000,000	42.0	9,950	945	F 4K
		(France)	1983	8,600,000	14,600,000	40.0	10,661	807	F 3K
12	(12)	POSCO	1984	9,194,552	9,100,000	30.0	14,957	615	$699
		(S. Korea)	1983	8,438,100	9,100,000	30.0	14,488	582	$331
13	(13)	LTV	1984	9,000,000	N.A.	N.A.	N.A.	N.A.	N.A.
		(U.S.A.)	1983	6,985,000	11,800,000	N.A.	31,000	N.A.	N.A.
14	(16)	Kobe Steel	1984	6,618,000	8,807,000	31.0	12,711	521	Yen 578 F1
		(Japan)	1983	6,062,000	8,807,000	33.0	13,069	464	Yen 495 F1
15	(15)	SAIL	1984	6,300,000	N.A.	N.A.	N.A.	N.A.	N.A.
		(India)	1983	6,100,000	11,800,000	N.A.	31,000	190	N.A.
16	(14)	SACILOR	1984	6,235,000	8,300,000	53.0	63,950	97	FF 2.7
		(France)	1983	6,976,000	8,461,000	48.7	67,500	103	FF 2.7
17	(19)	Broken Hill Pty	1984	6,110,613	6,600,000	20.1	30,399	201	A$241 F4
		(Australia)	1983	5,519,000	7,620,000	28.6	31,328	176	A$123.7 F4
18	(17)	Inland Steel	1984	5,877,477	8,436,820	0	19,500	301	$210
		(U.S.A.)	1983	5,720,677	8,436,820	0	20,500	279	$185
19	(21)	ISCOR	1984	5,770,300	7,300,000	34.0	39,700	145	R170 F3
		(S. Africa)	1983	5,435,900	6,950,000	32.0	40,900	133	R260 F3
20	(20)	Armco	1984	5,560,208	7,200,000	1.4	19,355	287	$92.5
		(U.S.A.)	1983	5,430,933	7,200,000	1.3	21,986	247	$80.7
21	(26)	Hoogovens Groep	1984	5,532,000	7,200,000	69.6	17,607	314	DFL614
		(Netherlands	1983	4,277,000	7,200,000	67.4	17,850	240	DFL460
22	(23)	Cockerill Sambre	1984	4,835,000	N.A.	74.0[6]	19,334	250	N.A.
		(Belgium)	1983	4,724,000	N.A.	62.0[7]	21,241	222	BF 1,310
23	(22)	National Steel	1984	4,812,000	5,500,000	0	12,502	385	$255
		(U.S.A.)	1983	4,576,000	5,500,000	0	12,708	360	$75.5
24	(25)	STELCO	1984	4,667,783	7,259,550	22.1	20,612	226	N.A.
		(Canada)	1983	4,334,622	7,245,950	23.0	19,519	222	C$35
25	(28)	Krupp Stahl	1984	4,395,000	N.A.	30.0	22,362	196	N.A.
		(W. Germany)	1983	3,904,000	N.A.	29.0	22,954	170	DM165
26	(31)	Sidermex	1984	4,317,000	5,690,000	16.0	39,087	111	$109K
		(Mexico)	1983	3,777,102	5,690,000	18.0	38,846	97	63K
27	(24)	Klöckner-Werke	1984	4,300,000	N.A.	N.A.	N.A.	N.A.	N.A.
		(W. Germany)	1983	4,400,000	N.A.	N.A.	N.A.	N.A.	N.A.
28	(30)	ENSIDESA	1984	4,108,261	6,000,000	34.0	21,012	195	Pts 32,800
		(Spain)	1983	3,799,872	6,000,000	34.0	22,356	170	Pts 6,534
29	(27)	Hoesch Stahl	1984	4,109,000	4,889,000	28.0	17,800	231	DM579
		(W. Germany)	1983	3,929,000	4,889,000	27.0	19,000	207	DM376

TOP 50

World's Top 50 Steel Producers in 1984

1984 Rank	(1983 Rank)	Company (Country)	Year	Crude Steel Production (metric tons)	Maximum Capability (metric tons)	Exports As % of Shipments	No. of Employees (Steelmaking)	Tons per Employee	Capital Expenditures 1985 Forecast 1984 Actual (Millions)
30	(29)	Voest-Alpine	1984	4,444,651	N.A.	65.0	16,200	274	öS 2,100
		(Austria)	1983	4,057,130	N.A.	62.0	16,600	244	öS 1,030
31	(33)	DOFASCO	1984	4,053,000	4,148,000	13.7	13,200	307	C$825[4]
		(Canada)	1983	3,360,000	4,298,000	11.3	11,400	295	C$91
32	(36)	Mannesmann[5]	1984	3,988,000	N.A.	N.A.	N.A.	N.A.	N.A.
		(W. Germany)	1983	3,654,000	N.A.	N.A.	N.A.	N.A.	N.A.
33	(34)	Arbed S.A.	1984	3,900,000	4,600,000	96.0	12,200	320	FLux 2,560
		(Luxembourg)	1983	3,200,000	4,600,000	96.0	13,500	237	FLux 1,970
34	(35)	Peine-Salzgitter	1984	3,627,700	7,100,000	42.0	12,735	285	N.A.
		(W. Germany)	1983	3,122,200	7,100,000	39.1	14,132	221	N.A.
35	(39)	N.V. Sidmar	1984	3,355,815	3,500,000	91.0	5,411	523	BF3.5K
		(Belgium)	1983	2,813,254	3,500,000	89.0	6,306	446	BF1.5K
36	(32)	China Steel	1984	3,340,572	3,250,000	27.9	7,486	446	NT$ 10,045
		(Taiwan)	1983	3,411,010	3,250,000	33.0	7,554	452	NT$ 2,622
37	(42)	Nisshin Steel	1984	2,965,000	5,473,000	24.3	8,762	338	Y 25,800K F1
		(Japan)	1983	2,585,000	5,481,000	25.3	8,965	288	Yen 40,100K F1
38	(37)	COSIPA	1984	2,915,634	3,160,000	37.0	14,389	203	$390
		(Brazil)	1983	3,018,000	3,160,000	45.0	14,096	214	$340
39	(N)	Tokyo Steel	1984	2,896,000	3,720,000	24.0	1,974	1,467	Yen 3,000
		(Japan)	1983	2,729,000	2,890,000	42.0	2,010	1,358	Yen 35,845
40	(41)	Svenskt Stål	1984	2,857,000	3,100,000	41.0	11,500	248	SEK500
		(Sweden)	1983	2,587,000	3,100,000	38.0	11,350	228	SEK533
41	(46)	Wheeling-Pittsburgh	1984	2,550,000	4,000,000	0.01	10,700	238	N.A.
		(U.S.A.)	1983	2,020,000	4,000,000	0.01	11,500	176	$26.9
42	(44)	SIDOR	1984	2,511,000	4,800,000	32.0	15,566	161	B 1,028
		(Venezuela)	1983	2,159,000	4,800,000	42.0	15,446	140	B 203
43	(43)	Arbed Saarstahl	1984	2,462,000	3,700,000	40.0	14,427	171	DM 65
		(W. Germany)	1983	2,397,000	3,700,000	41.0	16,236	148	DM 70
44	(22)	Weirton Steel	1984	2,396,841	4,000,000	0.6	7,699	311	$74
		(U.S.A.)	1983	1,995,499	4,000,000	0.5	6,874	290	$38
45	(45)	Algoma Steel	1984	2,294,000	N.A.	N.A.	9,000	255	N.A.
		(Canada)	1983	2,092,000	N.A.	N.A.	N.A.	N.A.	N.A.
46	(47)	Tata Iron & Steel	1984	2,060,000	2,120,000	N.A.	65,100	32	Rs. 1,260 F1
		(India)	1983	1,935,000	2,120,000	N.A.	64,800	30	Rs. 520 F1
47	(48)	Rautaruukki Oy	1984	1,773,000	1,900,000	46.0	4,478	396	FMK 850
		(Finland)	1983	1,632,000	1,900,000	45.0	4,534	360	FMK 397
48	(50)	Nucor Steel	1984	1,568,000	2,100,000	>1.0	1,780	881	$26
		(U.S.A.)	1983	1,432,000	2,100,000	>1.0	1,820	787	$28
49	(N)	Daido Steel	1984	1,410,000	1,720,000	11.8	5,400	261	Yen 17,446
		(Japan)	1983	1,330,000	1,560,000	13.7	5,300	251	Yen 17,329
50	(49)	AHV	1984	1,143,000	1,530,000	23.0	9,337	122	Ptas9,728
		(Spain)	1983	1,377,000	1,530,000	29.0	9,533	144	N.A.

FOOTNOTES

(N) New listing
K Thousand (Thousand million = Billion)
F1 Fiscal Year April 1—March 31
F2 Fiscal Year October 1—September 30
F3 Fiscal Year July 1—June 30
F4 June 1—May 31
[1] Sidebrás System, including USIMINAS and CSN
[2] Excludes ACOMINAS, which was under construction in '83 and '84
[3] Excludes CST and ACOMINAS. CST start-up was in Nov. '83
[4] Current program extends to late '80s
[5] Production primarily for internal use
[6] Exported 52 pct to EEC and 22 pct to others
[7] Exported 44 pct to EEC and 18 pct to others

Company Names Behind The Acronyms.

AHV — Altos Hornos de Vizcaya S.A.
COPSIPA — Companhia Siderúrgica Paulista
DOFASCO — Dominion Foundries & Steel Ltd.
INSIDESA — Empresa Nacional Siderúrgica, S.A.
ISCOR — S. African Iron & Steel Industrial Corp., Ltd.
POSCO — Pohang Iron and Steel Company Ltd
SACILOR — Aciéries et Laminoirs de Lorraine
SAIL — Steel Authority of India, Ltd.
SIDERBRÁS — Siderurgia Brasileira S.A.
SIDOR — C.V.G. Siderurgica del Orinoco C.A.
STELCO — The Steel Company of Canada, Ltd.
USINOR — Union Sidérurgique du Nord et de l'Est de la France

ber of firms could not, or would not, give a breakout. Other firms were purists and only reported persons directly involved in the steel production process.

To clarify the intent of how the survey results would be used, each recipient received copies of the 1983 *Iron Age* summary.

In view of what has been said previously about the plight of the Japanese steel companies, it is very significant that six of the top ten producers in 1984, based on "Tons Produced Per Employee," were Japanese. It indicates that size need not limit efficiency.

What About The People?

In view of the world overcapacity problem, it seemed inappropriate to cheer on the firms that were growing in size and number of people employed.

By the same token it seemed not quite right to cheer on those firms that were reducing payrolls in the name of efficiency. Nevertheless, the latter choice was selected to indicate where the rationalization of the steel industry is taking place and which firms are actually reducing staff and by how much.

British Steel and U.S. Steel again were in the rankings. In 1982, British Steel had a total of 103,700 employees. In 1983, 81,100; and in 1984, 71,100. The figure used this year for calculating its efficiency for just steel production was 50,700 persons. A comparable figure for the 1983 production results should have been 56,100 employees.

U.S. Steel Corp. also reduced staff during 1984 and made corrections to its reported figures. Thus, it reduced staff from 62,787 in 1982 to 44,559 in 1983 and 33,360 in 1984. And, more is planend.

Finsider continued its staff reduction program, which stood at 99,700 person in 1982; 94,100 in 1983; and 81,610 in 1984.

The majority of the firms that reduced employment during the year reported modest reductions of less than 6 pct. Only a few firms reported increases in total employment.

Best Management Rewarded

Proudest of the entire group in

1984 Top Ten Producers

Based on Tons Produced Per Employee

	Ranking	Company	Country	1984	1983
1	(39)	Tokyo Steel	(Japan)	1,475	1,358
2	(11)	USINOR	(France)	945	807
3	(48)	Nucor	(U.S.A.)	881	787
4	(12)	Pohang	(S. Korea)	615	582
5	(35)	Sidmar	(Belgium)	523	446
6	(14)	Kobe Steel	(Japan)	521	464
7	(5)	NKK	(Japan)	505	450
8	(1)	Nippon Steel	(Japan)	458	419
9	(8)	Kawasaki Steel	(Japan)	418	369
10	(7)	Sumitomo Metals	(Japan)	397	359

Steel Producers That Improved Production in 1984

Based on raw steel production by tonnage

		Company	1984-1983 (million tons)	Change (percentage)
1	(21)	Hoogovens	5.5 — 4.3	27.9
2	(7)	Siderbrás	11.4 — 9.1	25.3
3	(41)	Wheeling-Pittsburgh	2.5 — 2.0	25.0
4	(13)	LTV	9.0 — 7.0	22.2
5	(33)	Arbed S.A.	3.9 — 3.2	21.9
6	(44)	Weirton	2.4 — 2.0	20.0
7	(31)	Dofasco	4.0 — 3.4	17.6
8	(6)	Thyssen	11.7 — 10.0	17.0
9	(4)	British Steel	13.4 — 11.7	14.5
10	(26)	Sidermex	4.3 — 3.8	13.2

Best Productivity Improvement 1984 Versus 1983 (Tons/Employee)

Rank		Company	Tons/Employee 1983 — 1984	%
1	(41)	Wheeling-Pittsburgh	176 — 238	35.2
2	(33)	Arbed S.A.	237 — 320	35.0
3	(21)	Hoogovens Groep	240 — 314	30.8
4	(34)	Peine-Salzgitter	221 — 285	28.9
5	(3)	Finsider	129 — 166	28.7
6	(4)	British Steel	209 — 264	26.3
7	(2)	U.S. Steel	301 — 366	21.6
8	(37)	Nisshin Steel	288 — 338	17.4
9	(35)	Sidmar	446 — 523	17.3
10	(10)	Bethlehem Steel	277 — 325	17.3

TOP 50

Firms That Shrank in 1984 By Decreasing Employment

Rank		Company	1983 — 1984	% Change
1	(2)	U.S. Steel	44,559 — 33,360	25.1
2	(3)	Finsider	94,130 — 81,610	13.3
3	(43)	Arbed Saarstahl	16,236 — 14,427	11.1
4	(34)	Peine-Salzgitter	14,132 — 12.735	9.9
5	(4)	British Steel	56,100 — 50,700	9.6
6	(33)	Arbed S.A.	13,500 — 12,200	9.6
7	(22)	Cockerill Sambre	21,241 — 19,334	9.0
8	(28)	Hoesch Stahl	19,000 — 17,800	6.3
9	(27)	ENSIDESA	22,356 — 21,012	6.0
10	(16)	SACILOR	67,500 — 63,950	5.3

The Most Fortunate Producers Based on Highest Utilization

Rank		Company	Capacity — Production	% Change
1	(12)	POSCO	9.11 — 9.2	100.0
2	(36)	China Steel	3.3 — 3.3	100.0
3	(35)	Sidmar	3.5 — 3.4	97.2
4	(31)	Dofasco	4.2 — 4.0	95.2
5	(47)	Rautaruukki Oy	1.9 — 1.8	94.7
6	(40)	Svenskt Stål	3.1 — 2.9	93.5
7	(17)	BHP	6.6 — 6.1	92.4
8	(38)	COSIPA	3.2 — 2.9	90.6
9	(6)	Siderbrás	12.6 — 11.4	90.5

The Least Fortunate Producers Based on Lowest Utilization

Rank		Company	Capacity — Production	% Change
1	(10)	Bethlehem Steel	19.6 — 9.7	49.5
2	(34)	Peine-Salzgitter	7.1 — 3.6	50.7
3	(7)	Sumitomo Metals	21.7 — 11.3	52.1
4	(42)	SIDOR	4.8 — 2.5	52.1
5	(8)	Kawasaki Steel	20.8 — 11.3	54.3
6	(37)	Nisshin Steel	5.5 — 3.0	54.6
7	(1)	Nippon Steel	53.0 — 29.4	55.5
8	(5)	NKK	21.0 — 12.5	59.5
9	(44)	Weirton Steel	4.0 — 2.4	60.0
10	(2)	U.S. Steel	22.8 — 13.7	60.1
11	(3)	Finsider	21.4 — 13.5	63.1
12	(41)	Wheeling-Pittsburgh	4.0 — 2.6	65.0

the eyes of management are those ranked in the category "Best Productivity Improvement, 1984 Versus 1983 (Tons/Employee)."

This is the real stuff; the proof of the managerial pudding. Topping the list for 1984 is Wheeling-Pittsburgh Steel with a 35.2 pct improvement. Following closely is Arbed S.A., with 35.0 pct and the Hoogovens Groep with 30.8 pct.

Look closely here. U. S. Steel, Finsider, and British Steel, which ranked 2,3, and 4 in raw steel production in 1984, are right in there. Their efforts to increase productivity through shutdowns of inefficient plants and processes plus staff reductions are paying off, much to the discomfort of idled staff and the cheers of stockholders.

Exports, A Way of Life

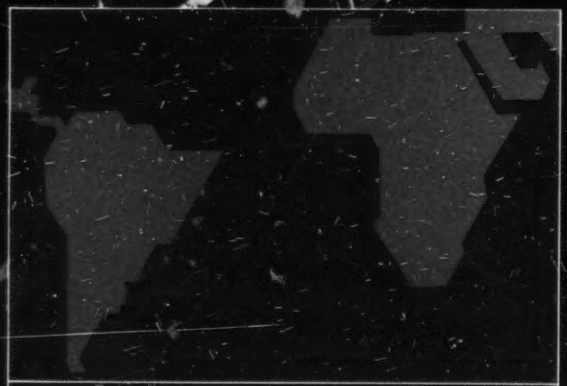
"Exports as a percentage of shipments " adds to the complete portrait of the world's steel industry. Not surprisingly, most U.S. steel producers included in this survey export little or no steel. European firms rely heavily on exports, which is understandable in view of the relatively small size of their countries and their limited domestic markets. So, large or small, these companies tend to be heavy exporters.

Japanese steel producers perhaps could have increased exports as a percentage of shipments but, under the threat of protectionism and other restraints on free trade, generally were limited to about a third of shipments. Unfortunately, domestic demand for steel was not strong enough to allow higher and more profitable utilization rates.

In fairness to all concerned, it was decided not to make a contest out of which company exported the most, or the least, as a percentage of shipments. The figures are nevertheless interesting and important. They will give legislators in concerned governments a clearer view of the interplay among marketing forces and economic well being. And, hopefully, it serves notice on nations that use the steel industry as a national symbol of strength and spirit that adding to an overflowing pot does little more than dampen the fire further. □

July 8, 1985

IRON AGE
METALS PRODUCER



STEEL IN THE THIRD WORLD

THE DRIVE TOWARD CONTINUOUS COLD STEELMAKING

QUANEX'S 'SEAM FREE' BAR PLANT IN ARKANSAS

JULY 5, 1985 VOL. 228, NO. 13

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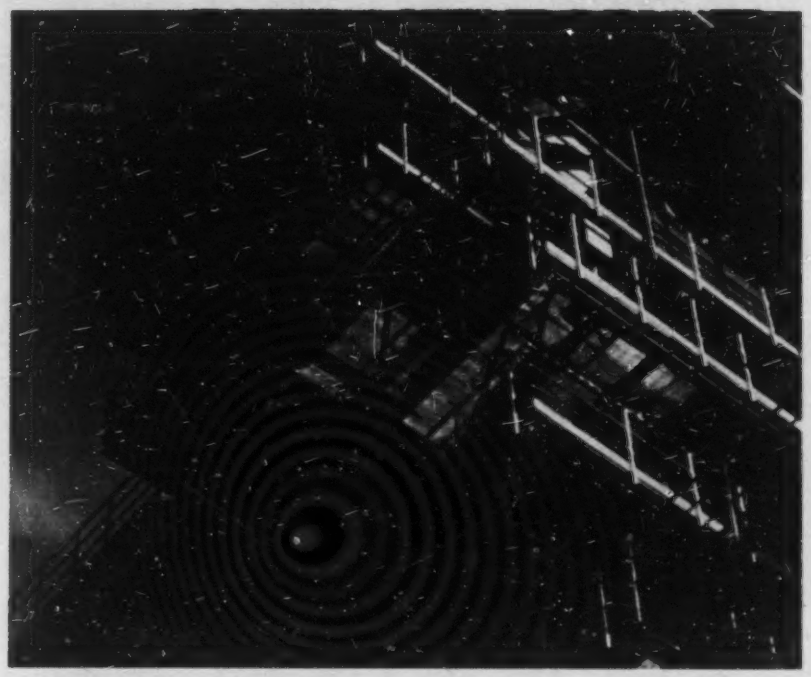

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IRON AGE (USPS 269-780) is published 24 times a year by CHILTON COMPANY, Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, PA 19087 and additional mailing offices. IRON AGE is sent on a controlled free basis to qualified managers in U.S. metalworking companies. All others: Manufacturing Management edition—$42 one year, $69 Canada/Foreign (24 issues); Metalsproducer U.S. edition—$24 one year (12 issues); $27 one year (6 issues). Single copies, $2.50. Cable Chilton Philadelphia.
Send address changes to IRON AGE, P.O. Box 1440, Riverton, N.J. 08077.

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Developing Countries: Total Debt and Debt Servicing Costs

Billions of U.S. Dollars	1980	1981	1982	1983	1984	1985
Total Debt	610	702	775	843	895	970
Servicing Costs	90	109	124	112	121	143
As a Pct of Total Exports	17	20	24	22	22	23

Source: Intl. Iron and Steel Institute

Western World Liquid Steelmaking Capacity

Million Metric Tons	1974	1980	1990
W. Europe	203	223	181/191
N. America	156	152	136/142
Japan	126	142	130/135
Dev. Countries*	33	60	104/116
Others	15	18	20/26
TOTAL	533	595	571/610

Source: Intl. Iron and Steel Institute
*NOW 70

Western World Apparent Steel Consumption Developing Countries, 1985/84

Million Metric Tons	1984 Actual	1985 Forecast	Pct Change 1985/84
Latin America	28	29	+4
Middle East	18	18	—
Africa (excl. S. Africa)	12	12	—
Asia (excl. Japan)	48	51	+6
TOTAL	106	110	+4

Source: Intl. Iron and Steel Institute

The big SIDOR complex in Venezuela has had problems. There were also problems initially at the FIOR direct reduction plant located in the same region of Venezuela.

STEEL IN THE THIRD WORLD

By 1990, it's expected the developing countries will have as much as 116 million tons of raw steel capability.

BY GEORGE MCMANUS

In 1984, the United States imported steel from 59 different countries.

These included Hong Kong, Bangladesh, Iran, and China. Developing countries like these supplied 10 million tons or 34 pct of the record U.S. imports in 1984.

That tonnage just about equalled the total raw steel capacity of Third World countries in 1960. With steelmaking largely confined to the industrial centers in those days, you weren't able to solve steel problems but you could at least come to grips with the problems.

Today, steel is being produced in nearly 100 countries. The steel capacity of the developing world rose from 10 million tons in 1960 to around 70 million tons (metric) in 1970. By 1990, it's expected the developing countries will have as much as 116 million tons of raw steel capability.

All of which is a source of great concern to steel people in the U.S. and the rest of the First World. With a

global surplus of 300 million tons, the smaller nations continue to build steel plants. Most of these plants are government owned and government backed. Many of these have more capacity than the home markets can absorb.

There are special reasons for concern today because capital and technology are highly mobile. There can be almost instant industrialization of low wage countries.

Until recently, the impact of this sudden transition was cushioned by unfavorable conditions in much of the developing world. Support facilities were deficient. More important, the low wages were offset by the low quality of the work force.

In tropical areas, people had lived for generations in a climate that discouraged strenuous exertion and made it possible to exist without too much exertion.

"All of a sudden you tell those people they should have an industry and work five days a week in such a foreign thing as a steel plant," said Eckart E. Goette, president of Midrex Corp. There is a culture shock that can only be overcome in time with education and good leadership, said Mr. Goette whose company brought direct reduction to Iran, Qatar and other unlikely places.

The problems of steel plants in Nigeria and other countries were noted by W. J. Bottomley, who helped build and operate the new Saudi Arabian steel mill before becoming executive vice president and general manager of Lectromelt Corp.

"They are just too bloody big for the local infrastructure," said Mr. Bottomley of the lagging operations. "The local capabilities are two generations away from what is involved in steel operations."

In other words, you can't simply plug in a new steel plant and watch the stuff roll out. It still takes competence and sweat to make steel. These ingredients, which have been missing in many past programs, are abundantly available in countries now building steel plants.

"One of the things the South Koreans have is a tremendous amount of self discipline," said Mr. Goette.

"I think we will see a similar kind of thing in China," said Mr. Bottomley.

Others report a good work ethic in the Philippines. "They have the potential of being another South Korea," said Ralph M. Smailer, manager of electric arc furnaces, Davy McKee Equipment Corp.

Mr. Bottomley had occasion to test this view when he was running the electric furnace shop at Al Jubail in Saudi Arabia. "I had both Indian and Filipino workers operating the furnaces," he said. "They could hold up their heads with anyone. They only had to be shown how and given some explanations and by golly, they were picking it up pretty damn good."

As this suggests, there are now a lot of places where there are good workers to go with the modern machines. If they think things are tough today, mill officials can consider a future in which steel may be made by one billion clever, hard working Chinese. The potential is there because there is no problem getting the money for machinery. The established countries are falling all over themselves trying to offer the most liberal financing of equipment.

South Korea

For South Korea's big steel expansion at Gwangyang, Voest-Alpine offered financing at 6.25 pct. Mannesman-Demag offered less than 7 pct for the Korean continuous caster. Davy McKee of Great Britain had a rate of 6 pct on the blast furnace.

Capital is available and the physical construction of a modern steel complex is possible in the most remote corners of the earth. Now operating on an island near Borneo is a Malaysian Midrex plant capable of producing 650,000 tons of briquetted iron a year.

"We have been able to build these rapidly," said Mr. Goette of Midrex. "It's possible to build a direct reduction plant in $2^1/_2$ years. We have been able to do that."

South Korea is probably the prime example of what happens when you combine efficient operations with primitive wages. One obvious effect is low cost steel; Korea has been able to invade even the Japanese market.

The second effect is surplus steel. By 1982, South Korea had a 6-million-ton surplus available for export. When people ride bicycles to work and operate Cadillac equipment, they will tend to produce more than they consume.

Without efficiency on the other hand, a country can have low wages and still consume more than it produces. That is still the situation of the developing countries as a whole. According to the International Iron & Steel Institute (IISI), The Third World will consume 110 million tons in 1985 and be able to produce no more than 70 million tons.

IISI looked for consumption of the developing countries to rise to 122 million tons by 1990. The gap between supply and demand will narrow, but consumption will still be greater—by 6 million tons.

Trinidad's steel program illustrates why there is a Third World steel deficit. That country's ISCOTT plant was started in 1981 with 500,000 tons of the most modern capacity. According to recent reports, production has been running about 10,000 tons a month and big losses have been piling up. Laclede Steel Co. and Bechtel have been invited in to straighten things out.

"They just did not know what maintenance was all about," said Pierre Gosselin, who headed operations at ISCOTT until a year and a half ago.

"When we started the equipment, everything was new and worked rather nicely," continued Mr. Gosselin, who is now production vice president for Sidbec-Dosco Inc. "But as time passed, the equipment got damaged. We pushed for repairs but we got to the point where it was almost useless."

Things might have been different, Mr. Gosselin said, had the original Trinidad prime minister remained in power. The new man "started a campaign to get all foreigners out of the country.... They weren't even listening to us."

Direct Reduction Plants Producing Steelmaking-Grade DRI

Installed or Under Construction as of June 1, 1985

Start-Up	Company	City	Country	Process	Units	Fuel	Capacity
1957	Hylsa	Monterrey	Mexico	HyL	1	Gas	95
1967	Tamsa	Vera Cruz	Mexico	HyL	1	Gas	235
1969	Hylsa	Puebla	Mexico	HyL	1	Gas	315
1970	NZS	Glenbrook	New Zealand	SL/RN	1	Coal	185
1971	HSW	Hamburg	W. Germany	Midrex	1	Gas	400
1971	GSC	Georgetown, SC	USA	Midrex	1	Gas	400
1973	Piratini	Charquedos	Brazil	SL/RN	1	Coal	65
1973	Dunswart	Benoni	S. Africa	Codir	1	Coal	150
1973	Sidbec	Contrecoeur	Canada	Midrex	1	Gas	400
1974	Usiba	Bahia	Brazil	HyL	1	Gas	250
1976	Sidor	Matanzas	Venezuela	HyL	1	Gas	360
1976	Siderca	Campana	Argentina	Midrex	1	Gas	330*
1976	Fior	Matanzas	Venezuela	Fior	1	Gas	400
1977	NISCO	Ahwaz	Iran	Purofer	1	Gas	330
1977	Sibec	Contrecoeur	Canada	Midrex	1	Gas	600
1977	Hylsa	Puebla	Mexico	HyL	1	Gas	630
1977	Sidor	Matanzas	Venezuela	Midrex	1	Gas	355
1978	Krakatau	Kota Baja	Indonesia	HyL	1	Gas	575
1978	Acindar	Villa Const.	Argentina	Midrex	1	Gas	600
1978	Qasco	Umm Said	Qatar	Midrex	1	Gas	400
1979	BSC	Hunterston	UK	Midrex	2	Gas	800*
1979	Hylsa	Monterrey	Mexico	HyL III	1	Gas	250*
1979	Soidac	Khor Al-Zubair	Iraq	HyL	2	Gas	485*
1979	Sidor	Matanzas	Venezuela	Midrex	3	Gas	1275
1980	SIIL	Paloncha	India	SL/RN	1	Coal	30
1980	Siderperu	Chimbote	Peru	SL/RN	3	Coal	100
1980	Krakatau	Kota Baja	Indonesia	HyL	1	Gas	575
1980	ISCOTT	Point Lisas	Trinidad	Midrex	1	Gas	420
1980	Sidor	Matanzas	Venezuela	HyL	2	Gas	1408
1981	Mining Corp.	Maymyo	Burma	K-M	1	Coal	20
1981	Nordferro	Emden	W. Germany	Midrex	2	Gas	880*
1981	Sidor	Matanzas	Venezuela	HyL	1	Gas	704
1982	Hadeed	Al Jubail	Saudi Arabia	Midrex	1	Gas	400
1982	Krakatau	Kota Baja	Indonesia	HyL	2	Gas	1150
1982	DSC	Warri	Nigeria	Midrex	2	Gas	1020
1982	ISCOTT	Point Lisas	Trinidad	Midrex	1	Gas	420
1983	OMEK	Kursk	USSR	Midrex	1	Gas	417
1983	Scaw Metals	Germiston	S. Africa	DRC	1	Coal	75
1983	Hadeed	Al Jubail	Saudi Arabia	Midrex	1	Gas	400
1983	Hylsa	Monterrey	Mexico	HyL III	1	Gas	500
1983	OSIL	Keonjhar	India	Accar	1	Coal	150
1984	SGI	Lubuan Island	Malaysia	Midrex	1	Gas	650
1984	ISCOR	Vanderbijilpark	S. Africa	SL/RN	4	Coal	600
1984	Mining Corp.	Maymyo	Burma	K-M	1	Coal	20
1984	SIIL	Paloncha	India	SL/RN	1	Coal	30
1985	Sicartsa	Las Truchas	Mexico	HyL III	2	Gas	1000
1985	Perwaja	Chukai	Malaysia	NSC	1	Gas	600
1985	Daysteel	Vanderbijilpark	S. Africa	Rot. Kiln	1	Coal	30
1985	NISCO	Ahwaz	Iran	Midrex	3	Gas	1200
1985	I&S Complex	Misurata	Libya	Midrex	2	Gas	1100
1985	OEMK	Kursk	USSR	Midrex	1	Gas	417
1985	USCO	Vereeniging	S. Africa	Plasma	1	Coal Gas	250
1986	Sicartsa	Las Truchas	Mexico	HyL III	2	Gas	1000
1986	Ipitata	Joda	India	Tisco	1	Coal	90
1986	OEMK	Kursk	USSR	Midrex	1	Gas	417
1986	NISCO	Ahwaz	Iran	HyL	3	Gas	1000
1987	Soidac	Khor Al-Zubair	Iraq	HyL	2	Gas	1000
1987	NISCO	Mobarakeh	Iran	Midrex	2	Gas	1280
1987	ANSDK	El Dikheila	Egypt	Midrex	1	Gas	716
1987	OEMK	Kursk	USSR	Midrex	1	Gas	417
1988	NISCO	Mobarakeh	Iran	Midrex	3	Gas	1920

*Not Operating

Trinidad might not be typical of the developing world but it isn't unique either. Another notable failure took place at a new steel plant in Nigeria.

"They didn't have the power to make steel once they were ready to go," said Mr. Bottomley.

When the plant did get going, it ran into bureaucratic supply problems. "They find they need some spare parts," said Mr. Goette. "These spare parts are held up in airports because of customs regulations."

The Russians have been involved in a Nigerian blast furnace plant. "They've been working on it for years and years," said an engineer. "I don't think that plant has ever been successfully operated."

"That situation has changed quite a bit," said Mr. Smailer of Davy McKee. "The work force is quite high quality." The region now has a surplus of qualified labor, he said.

The big SIDOR complex in Venezuela has had problems. There were also problems initially at the FIOR direct reduction plant located in the same region of Venezuela.

Mr. Goette insisted the Midrex plants have performed well in all cases. "The direct reduction process, itself, is very easy to manage," he said. "In all the countries where we've built direct reduction plants as part of steel operations, the problem has never been the direct reduction plant.

"The problem is the steelmaking," he continued. "You need a lot of experience and you need to react very quickly to unexpected situations."

The Midrex plant in Malaysia is the first of this type to be operated strictly on a merchant basis. Hot briquetted iron from the plant is being shipped to Turkey, Spain, and other places.

"They have some U. S. expatriates managing the plant," said Mr. Goette. "They involve the local people. The board consists of Malaysian people—well educated."

Saudi Arabia

In Saudi Arabia, the big Al Jubail plant has had a good start. "I would have to say ours was a success," said Mr. Bottomley.

Al Jubail has two Midrex series 400 reduction plants, three 6.8-meter, 70-mva furnaces, and three six-strand continuous casters. Construction products are rolled on a rod mill and a bar mill.

A complete infrastructure, including port facilities, was available. Not available in the area were management or hourly people.

"We utilized supervision from industrial countries," said Mr. Bottomley. "We relied on a labor force primarily from India and to a lesser degree, from the Philippines."

With out-of-town personnel, he noted, there are costs that don't occur in developing countries. "When you import people," he said, "you have to look after their housing, their food, their clothing, plus providing transportation to and from their home once a year. So they aren't cheap even though they might not take much money home in their pockets."

Saudi Arabia hopes to use local people eventually, but the plant will probably have to rely on outside managers for some time. Getting Westerners to stay in Saudia Arabia could become a problem because the country is moving away from the comfortable enclaves that used to be provided by the oil companies for their people.

It's now more necessary to conform to the conservative customs of the area. "The conditions can get the best of a lot of people ," said Mr. Bottomley.

More serious, he indicated, were problems created by the political structure. "It was a little difficult running what I call a scaled-up minimill and trying to work with the local bureaucratic methods," he said. "A steel mill is a great consumer and if you try to use bureaucratic procedures for purchasing, it does try one a bit."

Trying conditions have had an important effect in Nigeria. "They have had to import steel because the plant is not reaching its capacity," said Mr. Goette.

As IISI has reported, this is representative of the whole Third World situation. Like airline safety statistics, the steel deficit numbers offer only limited comfort to mills being buffeted by tonnage from developing countries. Individual developing countries have surpluses that are exported.

Deficits vs Surpluses

South Korea, Brazil, Taiwan, Romania, and Argentina are among the countries that have swung from steel deficits to surpluses in recent years. Mexico, with an overall deficit, still shipped nearly 800,000 tons to the U. S. in 1984.

There is surplus capacity and most of the developing nations are under heavy pressure to export. "Recent estimates put the external debt of developing countries at $608 billion in 1984, rising to $645 billion in 1985," said Lenhard J. Holschuh, secretary general of IISI. "The Third World's debt service payments will absorb one-third of its export earnings next year (1985)."

Two months ago, IISI boosted its debt estimate to nearly a trillion dollars in 1985. Brazil and Mexico both owe more than $80 billion. The foreign debt of Brazil's steel holding company was over $7 billion in 1983.

These massive obligations tend to force steel on the world market and they give the exporters a free trade constituency among U. S. lenders. The political clout of the lenders was remarked on by David M. Roderick, chairman of U. S. Steel.

When it looked as though the developing nations would default on their loans, said Mr. Roderick, "the cooperation out of Washington was astounding and rapid."

There have been various studies and papers on the steel programs of developing nations. IISI recently updated its capacity and consumption numbers. Financial subsidies were documented in a study supervised by Thomas Howell, who was then with the Washington law firm of Verner, Liipfert, Bernhard and McPhereson. The study was sponsored by U. S. Steel and Bethlehem Steel.

Steel production in Eastern Eu-

rope was covered in a paper by Joel Dirlam, professor emeritus, University of Rhode Island.

From these and other sources, it's clear there has been a high degree of government involvement in the developing world and that results have varied widely.

Brazil

Brazil's raw steel output rose from 7.1 million tons in 1973 to 15.3 million tons in 1980. Capacity reached 20 million tons in 1982.

Sixty-five percent of Brazil's steel capacity is owned by the state. A state holding company called SIDERBRAS, controls nine steel operations, including the three big integrated mills: CSN, COSIPA, and USIMINAS. At one point the government was planning an expansion to 34 million tons by 1988. Three new integrated mills were to be built.

The big expansion was never completed but with its own economy depressed, Brazil found itself in the 1980s with surplus steel capacity and a foreign debt of more than $80 billion.

Steel exports to the U. S. were increased from 540,000 tons in 1981 to 1.1 million tons in 1984. U.S. Commerce Dept. found dumping margins of 100 pct on hot-rolled sheet from COSIPA and 89 pct on plate from the same company.

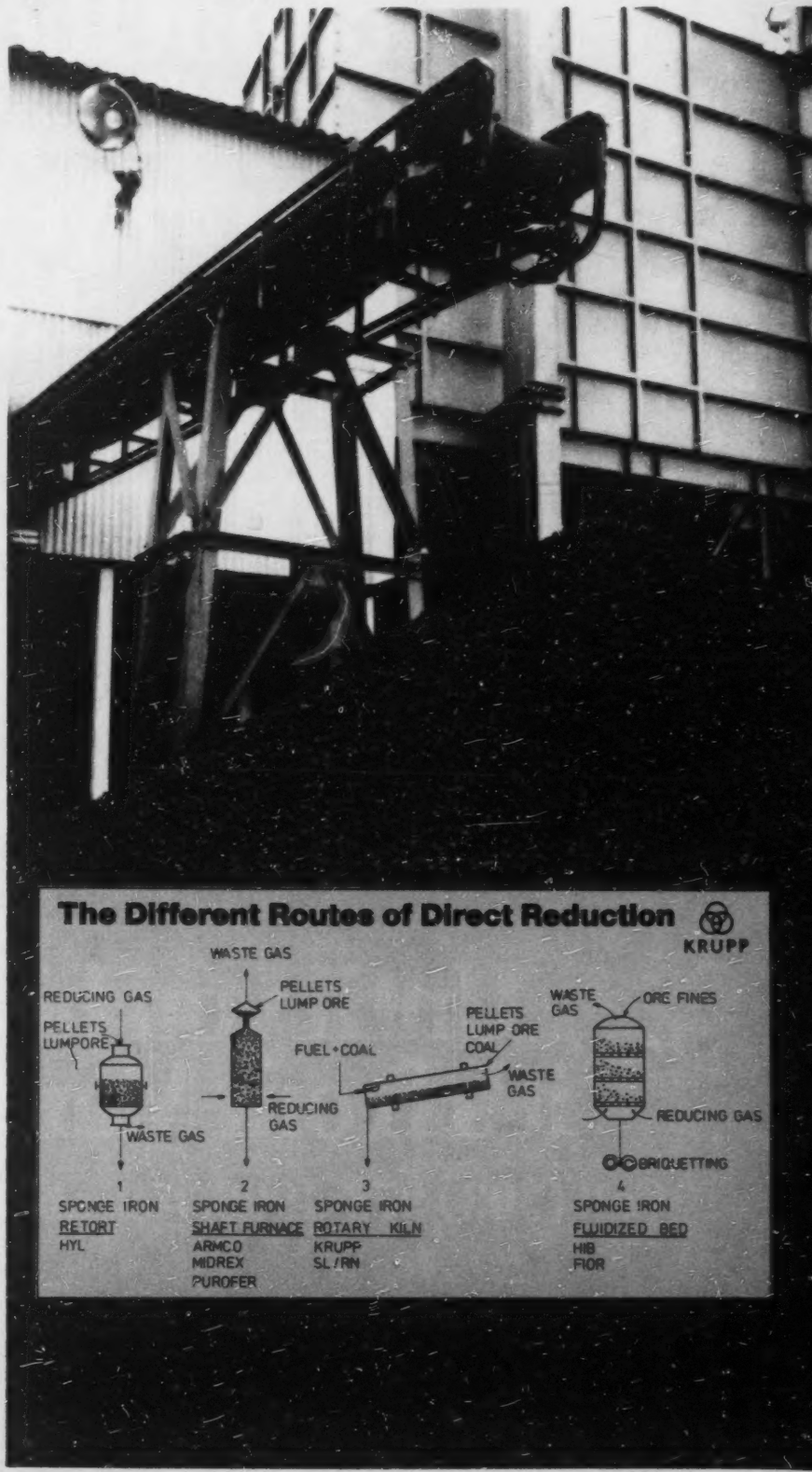
South Korea

The Pohang Iron & Steel Co., Ltd., was formed in 1968 with the Korean government having a controlling interest. Using war reparation funds from Japan, the government built the initial Pohang facilities. These could produce 1 million tons a year by 1973.

Successive expansions boosted Pohang's capacity to 9.1 million tons by 1983. The government was able to make low interest money available at home and provided backing for bargain financing abroad.

Under way now is the construction of a greenfield plant at Gwangyang. This could raise Pohang's capacity by 6 million tons.

South Korea began exporting in 1979 and by 1982 was shipping



nearly 6 million tons to other countries. Low wages, efficient production and aggressive pricing have enabled South Korea to penetrate major world markets including Japan's. In 1984, South Korea shipped 2.2 million tons to the U.S.

Spain

In 1982, Spain exported 5.1 million tons of steel.

The country was the world's eighth largest steel exporter, topping Brazil and Canada by goodly margins. In recent years, Spain's shipments to the U. S. have been the third largest of any developing country.

The trade volume has reflected a rise in Spanish capacity from about 3 million tons in 1964 to 16 million tons in 1982. With the domestic economy lagging, only 8 million tons were consumed at home in 1982.

Efforts to bring capacity into line with demand have met with strong popular resistance. A proposal to shut down a blast furnace operation at Sagunto brought street demonstrations by 35,000. The shutdown order was rescinded.

Spain's exports to the Common Market were limited to 900,000 tons a year by a bilateral agreement in 1978.

Taiwan

Taiwan can produce 7 million tons of steel a year. China Steel Corp., which is government owned, is the country's leading producer.

China Steel Corp. was formed in 1971, and plans called for facilities to produce 1.1 million tons by 1975. Construction was handled initially by Voest-Alpine and later by U. S. Steel.

By 1977, the first phase of China Steel had been completed at a cost just under $1 billion. In 1978, an expansion aimed at boosting capacity to more than 3 million tons was launched. Subsequent programs were scheduled to boost China Steel's capacity to 5.65 million tons and then to 11 million tons by 1991.

The recession of 1982 left Taiwan with more steel capacity than consumption. Exports were increased. With modern equipment and a dedicated work force, Taiwan has been able to sell its steel in Japan among other places.

Mexico

Mexico increased its capacity from 5.2 million tons in 1972 to 11.4 million tons in 1983. At the height of the oil boom, the country was shooting for a capacity of 20 million tons.

There is still that target, but activity has simmered down. More than half the steel capacity is held by three state-owned mills: AHMSA; Fundidora; and SICARTSA.

The privately owned HYLSA has 1.9 million tons of capacity and has pioneered the HYL direct reduction process. This is used by HYLSA and is in the current $3.35-billion expansion program of SICARTSA.

Mexico's situation helps explain how you can have a steel deficit in the Developing World and still have significant exports from the developing countries. Mexico is a net importer of steel but the country shipped nearly 800,000 tons of steel to the U. S. in 1984.

Venezuela

In 1974, Venezuela set out to increase its steel capacity from 1.5 million tons to 15 million tons by 1990.

A major element in this effort was to be an increase in SIDOR's capacity from 1 million tons to 4.8 million tons a year by 1979. In addition, a new greenfield mill was to be built in the ZULIA region.

SIDOR, which made extensive use of direct reduction, has had staggering losses—$500 million in 1981. There have been all kinds of production problems, but depressed conditions have reduced the domestic demand below supply.

One result is that SIDOR's exports increased more than 300 pct in 1983 to 785,000 tons. Of that total, nearly 500,000 tons were shipped to the U. S. in 1984.

Eastern Europe

The U. S. received nearly 700,000 tons of steel in 1984 from three Eastern Europe countries: Romania, Poland, and East Germany.

Relatively small quantities of steel came from Hungary, Yugoslavia, and Czechoslovakia. The total intake from the Eastern bloc was a little over 800,000 tons in 1984.

The Communist countries of Europe are closely tied to Russia in their steel operations. Iron ore, coke, and in some cases, semifinished steel come from Russia. Like that country, the Eastern nations have tended to lag in some phases of steelmaking. They have been slow in converting to continuous casting and oxygen steelmaking.

Although they probably don't make enough steel to really meet internal needs, the Eastern countries have become net exporters. Shipments to the Common Market are limited by bilateral agreements. Czechoslovakia has signed a voluntary agreement with the U. S.

In 1983, East Germany produced 35.7 million metric tons of raw steel. That was the highest in the East except for Russia. Other big producers were Poland with 16 million tons, Czechoslovakia with 15 million tons, and Romania with 13 million tons.

Exports to the U. S. have been erratic, spurting and subsiding periodically.

Voluntary Restraints

As of late May, major developing nations were among those that had signed steel import agreements with the U. S.

Brazil, Australia, Czechoslovakia, Finland, Mexico, South Africa, South Korea, and Spain had all agreed to limit steel shipments to the U. S.

The developed world was covered by an existing agreement with the Common Market and a new agreement with Japan.

Not covered by agreements were 42 of the 59 countries which shipped steel to the U. S. in 1984. "Imports from certain new suppliers have increased significantly," said President Reagan in May.

Mr. Reagan reaffirmed his pledge to limit imports of finished steel to 18.5 pct of U. S. supply. There could be problems but it appeared the developing nations were falling in line. In the first quarter of 1985, imports from these countries were down 6 pct from 1984. □

NOTE

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August 2, 1985

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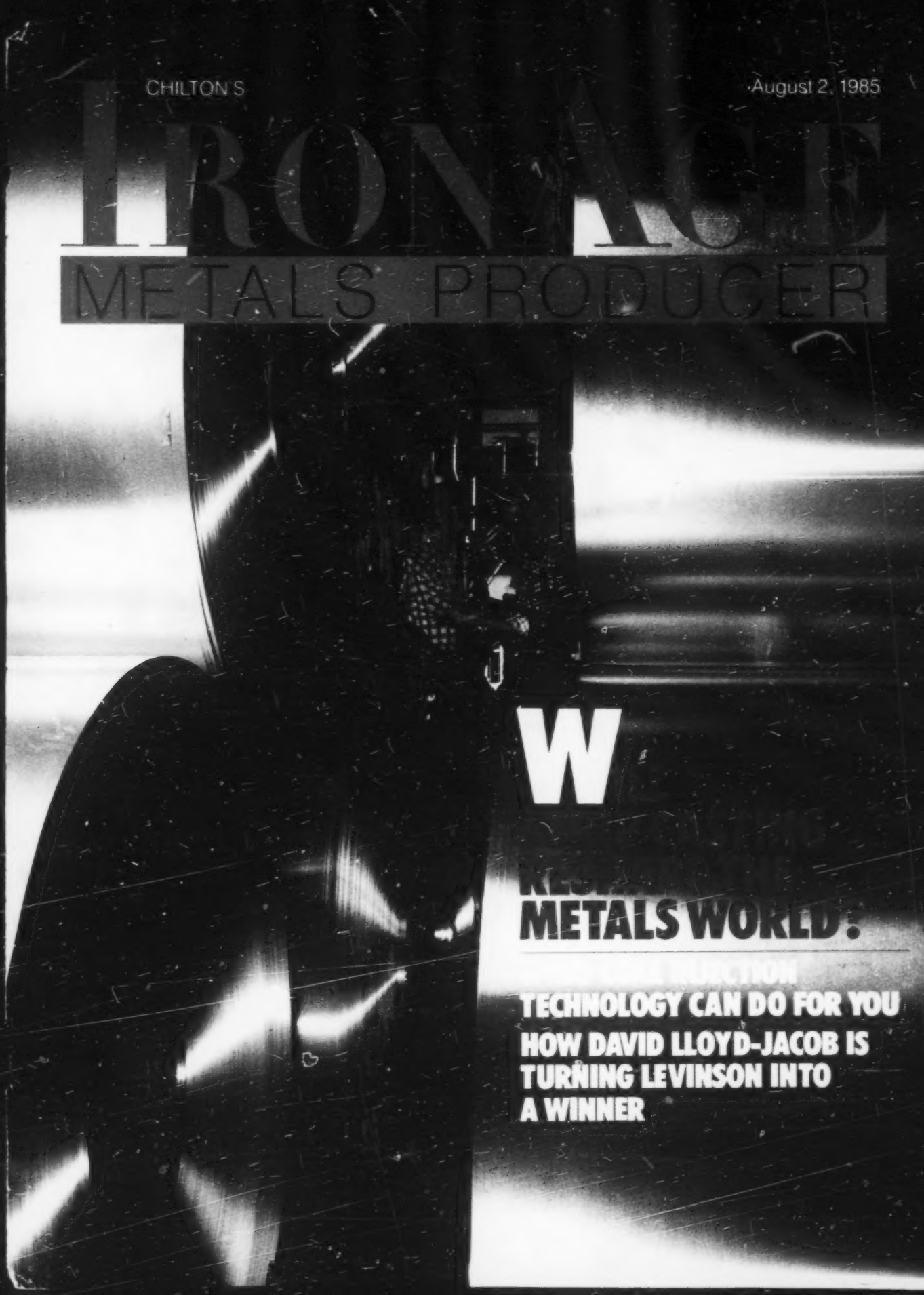

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METALS WORLD:

TECHNOLOGY CAN DO FOR YOU

HOW DAVID LLOYD-JACOB IS TURNING LEVINSON INTO A WINNER

AUGUST 2, 1985 VOL. 228, NO. 15

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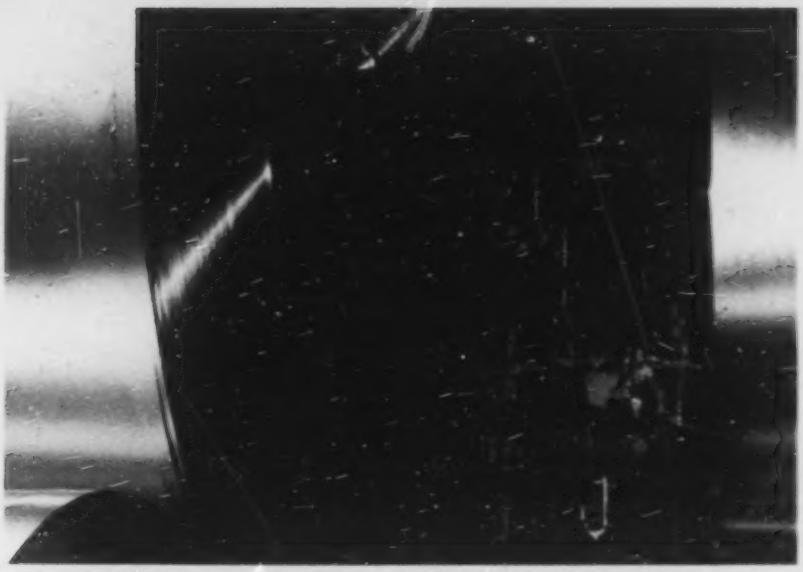

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LEVINSON TAKES ON A NEW ROLE

In what may be part of an important new trend, Levinson Steel Co. is now functioning as a mill depot for Bayou Steel Corp. of La Place, La.

The depot is in Pittsburgh, where Levinson is headquartered. Selling at mill prices, the company expects to serve customers within a 250-mile radius of the city.

In this area, said Levinson officials, the mini-mill products of Bayou will be available at about $30 a ton under the delivered prices of the nearest competing mini-mills.

"We will combine the advantages of a service center in terms of availability with the advantages of a mill in terms of price," said David Lloyd-Jacob, chairman of Levinson Steel.

This is a fairly unique combination. Carbon steel has always had one price at the mill and a separate and higher price at the service center. For the products involved, Levinson's mill depot price will average around $60 a ton under the same company's service center price.

Mr. Lloyd-Jacob saw no danger that the two-tier price structure will be blurred. In its service center business, he explained, Levinson deals with small orders and varied requirements. "Our average customer buys a ton of a size," he said. "He maybe buys three such sizes in an order."

In its role as a mill depot or distributor, he said, Levinson will have the truckload minimum of 20 tons.

Customers will be large users and other service centers.

"We are behaving just like a mill," said Mr. Lloyd-Jacob. "We have no discounts on payment terms and no other discounts. We are trying to be everything a mill is except the hardware is in La Place, La."

Mr. Lloyd-Jacob emphasized that the arrangement with Bayou was based on very solid economics.

"What we are doing here," he said, "is combining the availability of cheap barge rates, the availability of permanent surplus capacity at Bayou, and a hole in the market around Pittsburgh."

Traveling from south to north, the barge rate between La Place and Pittsburgh is only $10 a ton. "Were we to truck it or go by rail from Bayou, it would be approximately $60 a ton," said Tom Fries, Jr., sales vice president for Levinson.

The catch is that the minimum barge quantity is 1,500 tons. That means you have to deal in volume.

"We should at capacity be able to sell 100,000 tons out of the approximately 50,000 sq ft we have allocated to Bayou," said Mr. Lloyd-Jacob.

Excess Capacity

Bayou's surplus was partly due to the depressed state of the whole steel market. The company was particularly hard hit by the collapse of the nearby oil country market.

Another factor was the scale-up of mini-mill technology. The original concept was to build a mill small enough to exist on the local scrap supply and the local steel market.

Bayou's highly efficient facilities can turn out 600,000 tons a year, which is far more than the immediate area can absorb.

Accordingly, the company has entered into the Levinson deal and has set up its own mill depot in the Chicago area. Mr. Lloyd-Jacob said this was part of a general tendency of mini-mills to "burst out of the regional bubble."

According to reports, all the steel companies are doing some bursting.

To meet user demands for 'just-in-time' delivery, the large mills are said to be setting up field stocks at strategic points.

At Levinson, the products being supplied from Bayou's medium sec-

Bayou's surplus was partly due to the depressed state of the steel market. The company was hard hit by the collapse of the oil country market.

David Lloyd-Jacob
Chairman
Levinson Steel Co.

BY GEORGE MCMANUS

tion mill include beams, channels, angles, and related items. Mr. Lloyd-Jacob said the Pittsburgh region has had a deficit in these product lines.

"I have long believed this area needed a mini-mill," he said. (He considered building a mill.)

Other areas may come up short of certain products as the integrated mills continue to pull back. U.S. Steel has gotten completely out of standard structurals.

Other integrated producers are emphasizing the heavier structurals, produced to specifications for large projects.

This trend ties in with Mr. Lloyd-Jacob's contention that his gains will be at the expense of steel producers rather than other service centers.

There was concern on this point at the recent annual meeting of the Steel Service Center Institute.

"I think we calmed a number of people," said Mr. Lloyd-Jacob. "We will be taking a little bit from all the mills that supply Pittsburgh long distance." He noted, again, that other service centers are expected to be among the major buyers of the steel from Bayou.

General Nervousness

The initial uneasiness of service centers about the Levinson program reflected general nervousness in the industry. The acquisition of J. M. Tull Industries, Inc., by Bethlehem Steel Corp. suggested that steel producers may be seeking an expanded role in the service center field. Unlike basic steel, this field has produced both growth and profits in recent years.

Mr. Lloyd-Jacob, for one, has found a happy home in service centers. "Steel distribution is a great business," he said. "I wouldn't like to be a primary steel mill."

Mr. Lloyd-Jacob acquired Levinson Steel in 1983 after a varied career. He was born in Britain in 1938, the son of a World War I pilot who became a British high court judge.

After receiving degrees from Oxford University, his business life included work in the gold and zinc business and a stint as chief executive of Azcon Corp. In 1982, he spent a year as chairman of an Anglo-American arts festival. He looks and acts very British with a bluff manner and a rapid clipped way of speaking.

At Levinson, Mr. Lloyd-Jacob found a service center business that was losing money. Levinson had been a structural fabricator as well as a service center.

When fabricating was terminated in 1979, the company was left with facilities and a headquarters staff too big for the volume of business being done.

Instead of chopping off people and equipment, Mr. Lloyd-Jacob set out to increase volume. He acquired four Southeastern steel service centers of Glynwed Metals Industries in October of 1984. The acquisition and other moves boosted Levinson's sales from $20 million in 1983 to $30 million in 1984 and to an estimated $50 million in 1985.

With the added business, more efficient use of people and machines brought profits. "The computer has a certain capacity," said Mr. Lloyd-Jacob. "We can manage a doubling of size without having to buy another computer."

He is projecting sales of $100 million in 1986. He is looking at Birmingham as a possible site for another water-based mill depot. □

NOTE

ONLY THE FOLLOWING PAGES OF THIS

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CHILTON'S

September 6, 1985

IRON AGE METALS PRODUCER

SPECIAL AISE EXPOSITION SHOW ISSUE

Automation in Steel:

WHAT IT TAKES TO BE THE BEST IN THE BUSINESS

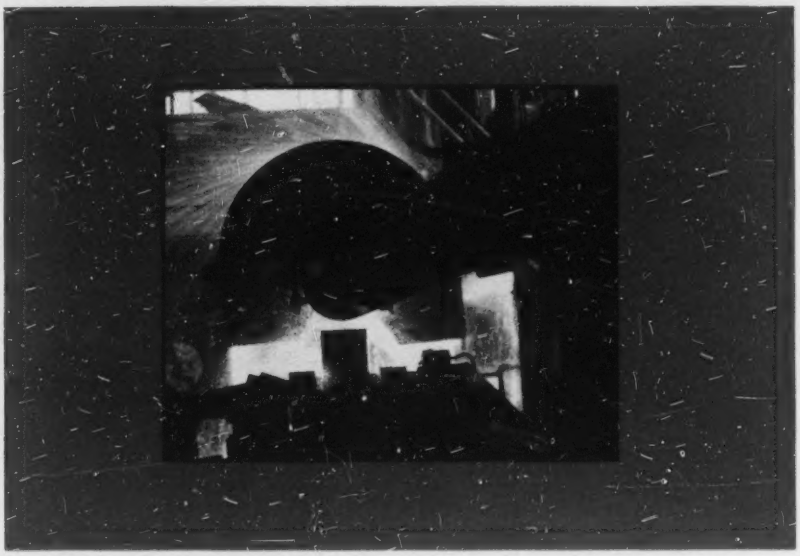
IRON AGE'S ANNUAL FINANCIAL SCOREBOARD:
WAS YOUR COMPANY A PERFORMANCE LEADER?

HOW REFRACTORIES ARE TAKING THE HEAT IN STEEL

SECOND QUARTER STEEL AND
NONFERROUS EARNINGS:
STILL NO END TO THE RED INK

SEPTEMBER 6, 1985 VOL. 228, NO. 17

IRON AGE
METALS PRODUCER



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NOT BY CASH FLOW ALONE

"Yeah, but what about their cash flow?"

This cutie is often thrown out by critics who would like to see the steel industry lose the investment tax credit.

They concede that steel profits are not all that great but look upon cash flow as a hidden pot of gold.

This is a bit like Marie Antoinette saying, "Let 'em eat cake."

Well, the cash flow isn't there, either.

As you all know, cash flow represents retained earnings plus depreciation plus a grab bag of items I don't want to drag in here.

(Note: Accountants need not write in. Simplicity has its place, particularly here.)

If you think that cash flow just can cover steel's capital equipment needs, look at the table below. Even if you don't think so, it wouldn't hurt to look.

The data comes from the American Iron and Steel Institute. It applies only to the steel operations of 83 pct of its members. The numbers are in millions of dollars.

Now for the table:

Year	1982	1983	1984
Earnings	$-3,385	$-2,235	$-248
Cash Flow	+956	-394	+741
Plant Spending	2,258	1,850	1,189
Shortfall	2,546	1,101	798

What to make of the numbers?

Stay with me.

Starting with the 'Earnings' line, they show the steel industry's profit position is improving.

The negative net income in 1984 was a far cry from the Rocky Horror Show of 1982.

And our second quarter earnings report on p. 85 shows them continuing to improve—not that you can say three of seven or so top producers being in the black calls for a celebration.

Nonetheless, despite ruinous price competition and our government's cavalier attitude toward steel trade agreements, the industry is getting a leg up on cutting costs, paring back losers and upgrading remaining plants.

OK. So, the industry seems poised for a comeback.

But where will the funds come from to push on with plant modernization?

If you say cash flow, I'll throw a fit and suggest you look over the table more closely. Here's why:

Despite some progress, the steel industry's cash flow in the past two years was still not enough to overcome the shortfall between the cash generated by the industry and what had to be spent to modernize and keep it afloat.

How could anyone be short $780 million in one year and over $4 billion in three years and not have to write home for help?

Yet, that's what the investment tax credit is designed to do—sentiment in Congress calls for cutting back or cutting out the ITC just at a time when it may do the steel industry some real good.

Even worse, dumping the ITC is a closely held tenet of the Administration's tax deform, er, I mean, tax reform program. It would cost all U.S. industry some $200 billion in tax credits per year.

Warning: As the facts show, steel can't live on cash flow alone.

This is a bit like Marie Antoinette saying, 'Let 'em eat cake.'

Gene Beaudet

GENE BEAUDET
Editor-in Chief

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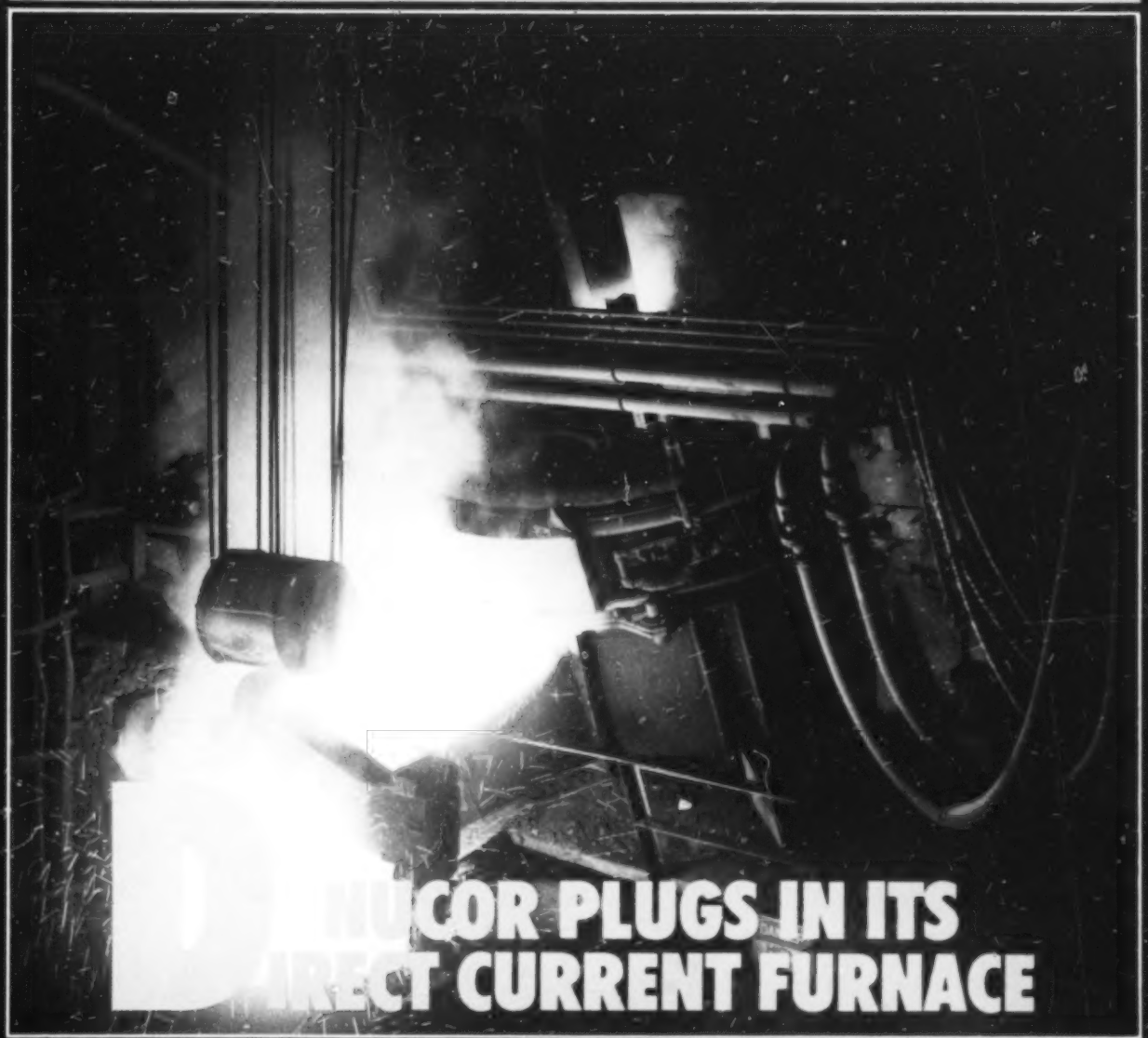
October 4, 1985

IRON AGE

METALS PRODUCER



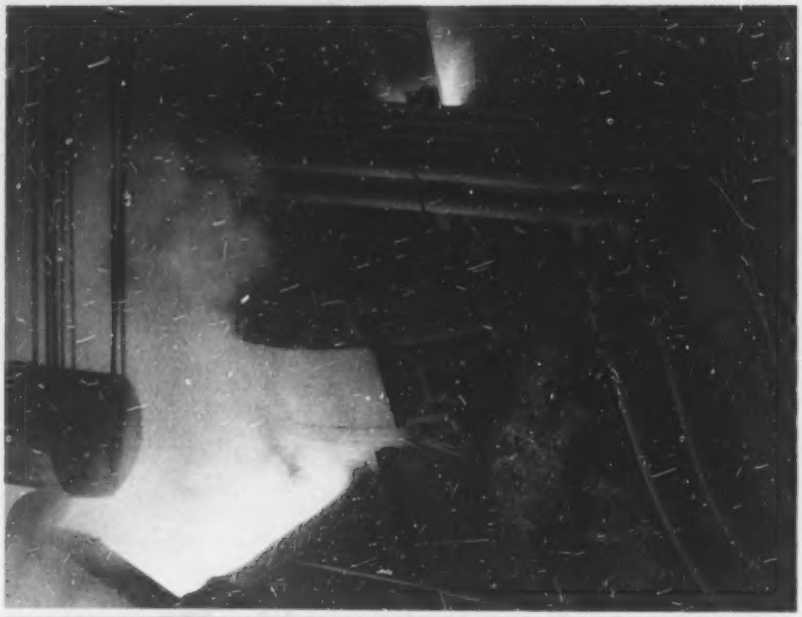
NUCOR PLUGS IN ITS DIRECT CURRENT FURNACE

4TH QUARTER MANUFACTURING FORECAST: SLOWER BUT STILL GOING

INDIRECT TRADE: THE UNCOUNTED STEEL IMPORTS

OCTOBER 4, 1985 VOL. 228, NO. 19

IRON AGE METALS PRODUCER



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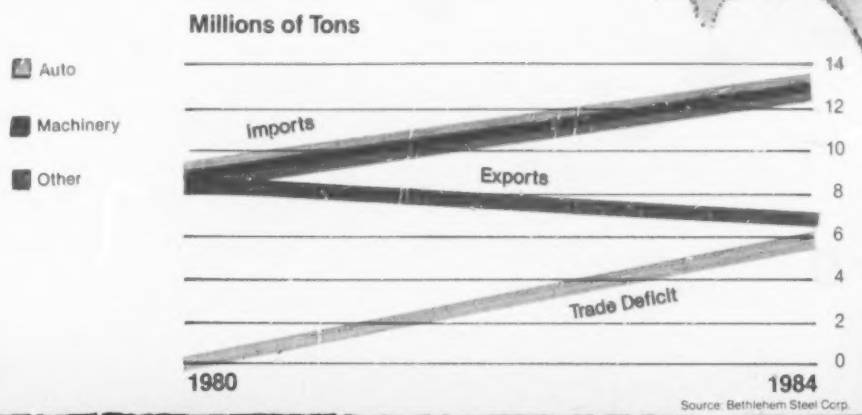
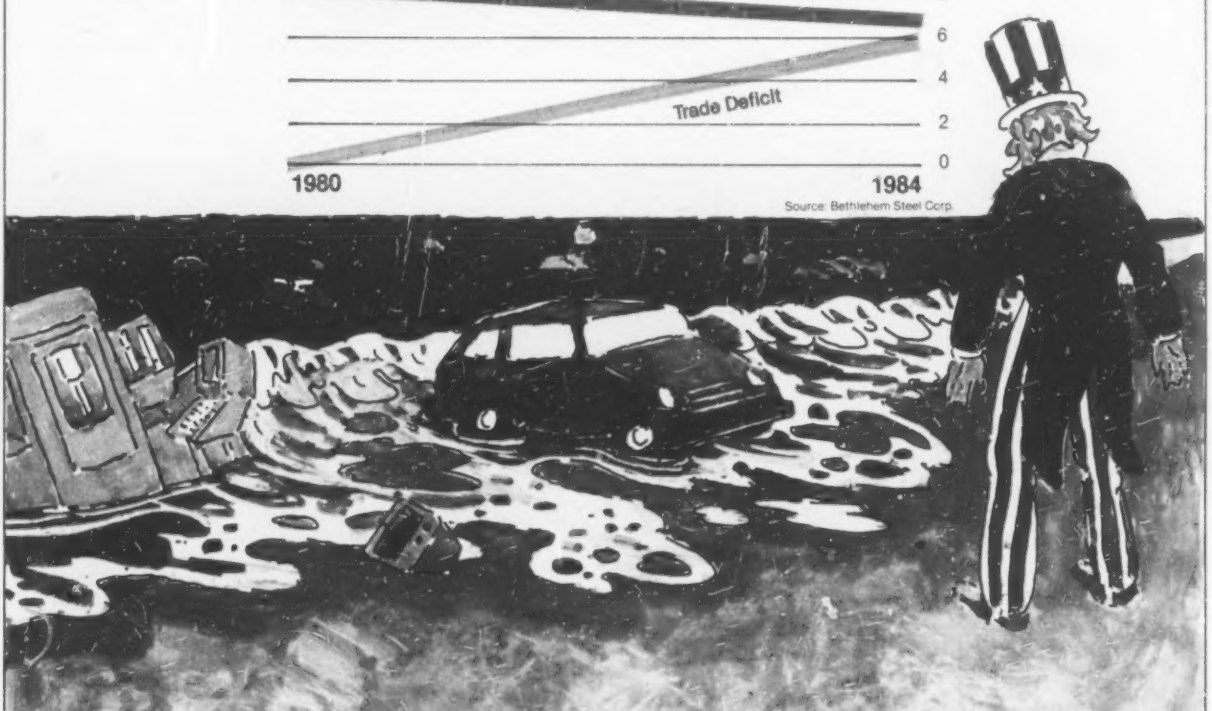
INDIRECT TRADE:
THE UNCOUNTED STEEL IMPORTS

The nation's steelmakers are threatened not only by imports of steel products, but also by the rising tide of autos, machinery and other made-from-steel products arriving on U.S. shores.





BY GEORGE J. MCMANUS

In 1984, the United States imported nearly 40 million tons of steel.

If that number seems high, it's because it includes the 13 million tons of steel contained in imported autos, appliances, and other manufactured products.

These indirect steel imports were part of a three-pronged assault on the domestic market. Direct steel imports rose from under 20 million tons in 1981 to 26 million tons in 1984. Indirect steel imports rose from 9 million tons in 1981 to 13 million tons in 1984. And indirect steel exports fell from 6 million tons in 1981 to 4 million tons in 1984.

The swing in indirect trade is quite recent. "For at least 10 years prior to 1982, the steel content was roughly in balance," said Joseph M. Workman, manager of business planning and marketing administration, Bethlehem Steel Corp.

"By 1984, the situation had deteriorated to a negative balance of about 6 million tons," said Mr. Workman.

(Cont. on p. 65)

1984 IMPORTS OF SELECTED METAL PRODUCTS #QL

(In thousands of dollars)

	Shipments of U.S. Producers	Exports	Net Shipments	Imports	Total U.S. Supply	Import Share
Metal Cutting Machine Tools SIC 3541	$ 2,611	$ 400	$ 2,211	$ 1,150	$ 3,361	34.2%
Metal Forming Machine Tools SIC 3542	$ 1,252	$ 278	$ 974	$ 294	$ 1,268	23.2%
Power Driven Hand Tools SIC 3546	$ 1,887	$ 307	$ 1,580	$ 570	$ 2,150	26.5%
Construction Machinery SIC 3531	$10,650	$2,675	$ 7,975	$ 1,125	$ 9,100	12.4%
Food Products Machinery SIC 3551	$ 2,482	$ 258	$ 2,224	$ 592	$ 2,816	21.0%
Textile Machinery SIC 3552	$ 1,020	$ 255	$ 765	$ 860	$ 1,625	52.9%
Printed Trades Machinery SIC 3555	$ 2,354	$ 480	$ 1,874	$ 700	$ 2,574	27.2%
Telephone & Telegraph Apparatus SIC 3661	$12,640	$ 795	$11,845	$ 1,740	$13,585	12.8%
Semiconductors & Related Devices SIC 3674	$17,737	$5,600	$12,137	$ 7,800	$19,937	39.1%
Engineering & Optical Instruments SIC 3832	$ 7,912	$2,065	$ 5,847	$ 1,142	$ 6,989	16.3%
Motor Vehicle Parts & Accessories SIC 3714	$55,233	$8,786	$46,447	$10,920	$57,367	19.0%
Aircraft Engines & Engine Parts SIC 3724	$10,173	$3,080	$ 7,093	$ 1,401	$ 8,494	16.5%
Household Furniture SIC 251	$15,758	$ 195	$15,563	$ 2,048	$17,611	11.6%
Radio & Television Receiving Sets SIC 3651	$ 6,658	$ 630	$ 6,028	$ 9,000	$15,028	59.9%

Source: U.S. Commerce Department.

In some ways, the indirect imports are a greater concern to domestic steel producers than direct imports. Direct imports can be dealt with through dumping cases, government curbs and commercial reactions. These courses haven't been too rewarding for domestic mills, but they have produced a Reagan Administration commitment to hold down imports.

To the extent that this commitment is meaningful, it will probably tend to steer imports downstream into manufactured products. Even without government restraints, it would be logical for foreign countries to export high value products rather than raw metal. The dollar has weakened a little in the last month or so, but exchange rates still favor imports of foreign products.

To combat imports of autos, machines and the like, domestic mills can only provide the greatest possible value and hope for the best. Part of the value is price, and there's no question the long-term pricing strategy of the domestic steel industry has been influenced by the need to keep customers competitive with manufactured imports.

The steel industry has kept tabs on indirect trade, but as Mr. Workman indicated, this didn't seem an urgent matter until the last few years. Accordingly, indirect trade information was collected in a fairly leisurely and round-about way.

IISI data

Every three years, the International Iron & Steel Institute (IISI) gathered export data from member companies. United States Steel Corp. and the Census Bureau gave the destinations of U.S. metal product exports. The same kind of information was provided by 14 other major countries.

By adding the destination numbers and converting units to tons, IISI was able to calculate the indirect imports of different countries.

The last IISI report, which was for 1982, showed 57 million metric tons of indirect steel exports for the whole world. (Cont. on p. 67)

U.S. INDIRECT STEEL TRADE — 1982

(In thousands of tons)

	IMPORTS	EXPORTS
Intermediate Goods	652.2	78.6
Power Generating Machinery	464.8	492.5
Processing Machinery	256.2	1290.0
Other Machinery	724.9	935.0
Electrical Machinery	275.5	400.6
Agricultural Machinery	228.3	430.3
Rolling Stock	148.7	71.2
Passenger Cars	2820.0	434.5
Commercial Vehicles	1853.0	480.8
Motor Vehicle Parts	1225.8	1506.8
Appliances	103.9	137.3
Other Manufactured Goods	786.5	869.6
Total	9043.2	7179.8

Source: IISI

The total North American intake was 6.8 million tons. In this total, shipments between the U.S. and Canada were treated as internal movements and excluded. With imports from Canada included, the IISI report showed the U.S. indirect steel imports to be more than 9 million tons in 1982. That compared with U.S. indirect exports of a little more than 7 million tons.

The IISI report for 1982 didn't appear until 1985 and it didn't include exports from South Korea, Taiwan, or numerous other developing nations. With indirect trade rapidly rising and broadening, steel men have been seeking more timely and complete statistics.

Working with the American Iron & Steel Institute (AISI), Bethlehem Steel came up with its own estimates. AISI took over the monitoring job from U.S. Steel and has asked the U.S. Commerce Department to provide annual figures on indirect steel trade.

It's no great consolation to steelmakers, but the expanding scope of imports has at least substantiated an old contention. "This is not just a problem of steel and heavy industry," said Mr. Workman.

With imports of semiconductors and other high-tech items zooming, it can't be argued that foreign trade is hurting just a few backward, smokestack industries.

Auto imports

The automobile accounts for the biggest chunk of indirect steel trade. The IISI 1982 report said U.S. imports of passenger cars represented nearly 3 million tons of steel and another 3 million tons were added by imports of commercial vehicles and auto parts.

Bethlehem placed the 1984 steel content of auto imports at 7 million tons. Whatever the exact number, it's about to increase as a result of lifting the restraints on Japan's shipments of autos to the U. S.

"They were shipping cars at the rate of about 1.8 million a year," said David M. Roderick, chairman of U.S. Steel. "They're now saying it will go to 2.4 million or 2.5 million cars. We'll have another 600,000 or 700,000 Japanese cars here this year."

Mr. Roderick noted that the auto market has been the only strong spot for domestic steel producers.

For domestic mills, the big disappointment in the last few years has been the capital goods market. This has never gotten off the ground and one reason has been a sharp trade shift. U.S. imports of capital goods went from $38 billion in 1982 to $62 billion in 1984. Meanwhile, exports were relatively stable.

As a result this country's favorable trade balance on capital goods has been shrinking. The net effect of machinery trade the last few years has been to reduce domestic steel consumption by 2 million tons.

Given the range of today's imports, it might be supposed the affected industries would band together in their efforts to secure government action. As Mr. Workman noted, individual industries were ignored in the past on the pretext that their problems were isolated.

There is an organization called the Trade Reform Action Coalition. This includes everything from the American Mushroom Institute to the International Ladies Garment Workers Union. However, the organization doesn't seem to have any comprehensive trade data.

There may be a comprehensive report somewhere, but repeated calls to the Commerce Dept. failed to produce a single document that identified the major areas of import penetration. □